

RESEARCH ARTICLE

Phytobia (Diptera: Agromyzidae) from Brazil: new species, new record and a key to the Neotropical species

Viviane Rodrigues de Sousa¹, Márcia Souto Couri¹
¹Museu Nacional, Universidade Federal do Rio de Janeiro. Quinta da Boa Vista, São Cristóvão, 20940-040 Rio de Janeiro, RJ, Brazil.

Corresponding author: Viviane Rodrigues de Sousa (sousavrodrigues@gmail.com)

<http://zoobank.org/2B7DC28E-6EBF-4031-803D-2329EDF2071E>

ABSTRACT. *Phytobia* Lioy, 1864 flies occur in all continents. There are four recorded species of these flies in Brazil, but recent expeditions at unexplored areas in the country have revealed that the genus is far more diverse than previously known. Based on material collected in the states of Mato Grosso, Mato Grosso do Sul, and Rondônia (as part of the SISBIOTA Diptera Project), we describe fourteen new species of *Phytobia*. Additionally, we redescribe *P. kallima* (Frost), previously recorded only from Panama, and provide a key to the 32 resulting Neotropical species. All descriptions include details and illustrations of the male and female terminalia. The specimens are deposited in the collections of Museu de Zoologia, Universidade de São Paulo (São Paulo, Brazil) and Museu Nacional, Universidade Federal do Rio de Janeiro (Rio de Janeiro, Brazil).

KEY WORDS. Brazilian species, leaf-mining flies, morphology, taxonomy, tropical forest.

INTRODUCTION

Phytobia Lioy, 1864 includes about 65 species worldwide, according to Boucher (2010) (90 in Zlobin 2007). Of these, 18 are known from the Neotropical Region (Martinez and Étienne 2002, Sasakawa 2005, Zlobin 2008), including four from Brazil (Martinez and Étienne 2002). With the exception of *Phytobia xanthophora* Schiner from São Paulo, all Brazilian species, listed below, were described by Spencer (1966): *P. lanei* Spencer (Minas Gerais), *P. kuhlmanni* Spencer (São Paulo), and *P. rabelloi* Spencer (Mato Grosso).

Phytobia species have a unique feeding behavior among the Agromyzidae. Their larvae feed on young xylem, a plesiomorphic feature within the family (Nowakowski 1962). All mining larvae of *Phytobia* are found in stems and branches, next to the cambium of deciduous trees. However, contrary to previous beliefs (Spencer 1973), they do not feed directly on cambium cells: they feed on young, undifferentiated cells right after these cells detach from the cambium; the meristematic cells remain untouched (Wallner and Gregory 1979, Ylioja et al. 1998). This feeding habit, the large size of some species, the worldwide distribution of the genus, and the occurrence of species with plesiomorphic characters, dicot plants such as Rosaceae (which are present in fossils from the Eocene period), suggest that *Phytobia* is a very old genus (Spencer 1990). At least two extant conifer genera serve as hosts for these flies, *Callitris*

Vent. in Australia, and the fossil *Juniperoxylon silesiacum* (Prill) Kräusel (both Cupressaceae) (Süss 1979).

Phytobia flies are economically relevant because they damage several trees that are important to humans (e.g., cricket bat, cheese box, and inlay industry). The larval marks, called “pith flecks”, may decrease the commercial value of wood (Dempewolf 2004). In North America, *Phytobia* flies occur in *Acer* L. (Sapindaceae), *Betula* L. (Betulaceae), *Amelanchier* Medik., *Crataegus* L., and *Prunus* L. (Rosaceae), whereas in Europe they feed on *Betula* and *Alnus* Mill. (Betulaceae), *Crataegus*, *Sorbus* L., and *Malus* Mill. (Rosaceae), *Populus* (L.) and *Salix* L. (Salicaceae) (Spencer 1981). Spencer (1973) mentioned five species that attack the twigs and trunks of Betulaceae, Salicaceae, and Rosaceae in Europe and North America. In the most recent host list (Benavent-Corai et al. 2005) the hosts of only eleven described species of *Phytobia* from the Palearctic and Nearctic regions are indicated.

Although the host plants of all Neotropical *Phytobia* are yet to be documented, it is believed that their larvae are xylem feeders (Spencer 1966, Spencer and Stegmaier Jr 1973, Zlobin 2008). For instance, the larval galleries in the cambium of *Wedelia calycina* (L.) (Asteraceae) from Petit-Bourg in Guadeloupe have been attributed to *Phytobia* sp., although no adults have been reared from these plants (Étienne and Martinez 2003).

The identification of *Phytobia* can be difficult, since some species have characters of the Agromyzinae while others have

characters of the Phytomyzinae. Using the key of Boucher (2010), for example, different *Phytobia* species will key out to either one of the subfamilies. Although the genus is similar to *Agromyza* Fallén in the shape of the Sc vein, both genera can be easily segregated based on the the absence of the stridulatory mechanism, which is present in all *Agromyza* species (males and females), (Spencer and Steyskal 1986). Some *Phytobia* species are included in groups, e.g. the *Phytobia unica* group, which includes species with Sc joining R_1 before reaching C and the distal margin of R_1 usually expanded near the junction, as in the Agromyzinae (Boucher 2010).

Scheffer et al. (2007) did a molecular analysis of the Agromyzidae in which they included three north temperate species of *Phytobia*. In their data, there was no support for the basal position of *Phytobia*. The authors also noted that representatives of tropical species should be included in further analyses to help clarify the phylogenetic position of the genus. According to Zlobin (2008), the monophyly of Neotropical *Phytobia* is still not confirmed and needs future studies.

This paper describes fourteen new species of *Phytobia* and presents the redescription of *P. kallima* (Frost), newly recorded from Brazil. An illustrated key to 32 valid Neotropical species is provided.

MATERIAL AND METHODS

Specimens were collected in three Brazilian states: Mato Grosso, Mato Grosso do Sul, and Rondônia, where expeditions were made during 2011 and 2013, as part of the “SISBIOTA Diptera Project”, a project that aimed to access the Diptera fauna of hitherto unexplored areas of Brazil. The material was captured using entomological nets and Malaise traps and was preserved in 98% alcohol. All specimens were mounted on entomological pins and deposited in the collections of Museu de Zoologia, Universidade de São Paulo (MZUSP) and Museu Nacional, Universidade Federal do Rio de Janeiro (MNRJ).

Male and female terminalia were macerated in KOH 10% for 48 hours and then placed in concave slides with glycerin for dissection. The drawings were made under an optical microscope using a camera lucida. Digital images of the species were made using a Leica MZ16 stereomicroscope and the AutoMontage software (Syncroscopy, version 5.03.0061). The terminology follows Cumming and Wood (2009) and Boucher (2010).

A key was elaborated to segregate the 32 species recorded from the Neotropical region and includes information on their geographical distribution, illustrations of the male terminalia for the new species, and illustrations and diagnoses available in the literature (for the previously described species). Additional characters are added within brackets. The types of the species from Brazil are deposited in the MZUSP collection, and were examined for the preparation of the key and for comparisons with the new species. Only the terminalia of the adult male of *P. xanthophora* were analyzed, since all other parts have been lost.

Abbreviations for morphological and chaetotaxy terms: (acr) acrostichal setulae; (C) costal vein; (CuA_1) cubital A_1 ; (dc) dorsocentral seta; (dm-cu) discal medial-cubital crossvein; (ia) intra-alar seta; (ivt) inner vertical seta; (M) medial vein; (npl) notopleural seta; (oc) ocellar seta; (ori) lower frontal seta; (ors) upper frontal seta; (ovt) outer vertical seta; (pal) postalar seta; (pd) posterodorsal seta; (pp) propleural seta; (pprn) postpronotal (humeral) seta; (prs) presutural seta; (R_1) first radial vein; (R_{4+5}) third radial vein; (r-m) radial medial crossvein; (Sc) subcostal vein.

TAXONOMY

All *Phytobia* species studied share the following characters: interfrontal hairs absent; eye bare; oc long, strong, parallel, and forward directed; ivt long and strong; ovt strong and outward directed; one row of strong peristomals; pp present; 1 prs; 1 ia; 1 sa; 2 pal; 1 prn; posthumeral absent; 2 long and strong pairs of scutellar setae, 1 sub-basal, 1 apical; katapisternum with medium and thin setae and 1 long and strong posterior seta; Sc joining R_1 before reaching C and distal margin of R_1 straight at junction; C extending to M; fore femur with strong row of pd setae; fore tibia with 1 ventral apical seta; mid and hind femora without differentiated setae; mid tibia with 1 ventral apical seta; hind tibia with an apical ventral seta.

Phytobia amazonica sp. nov.

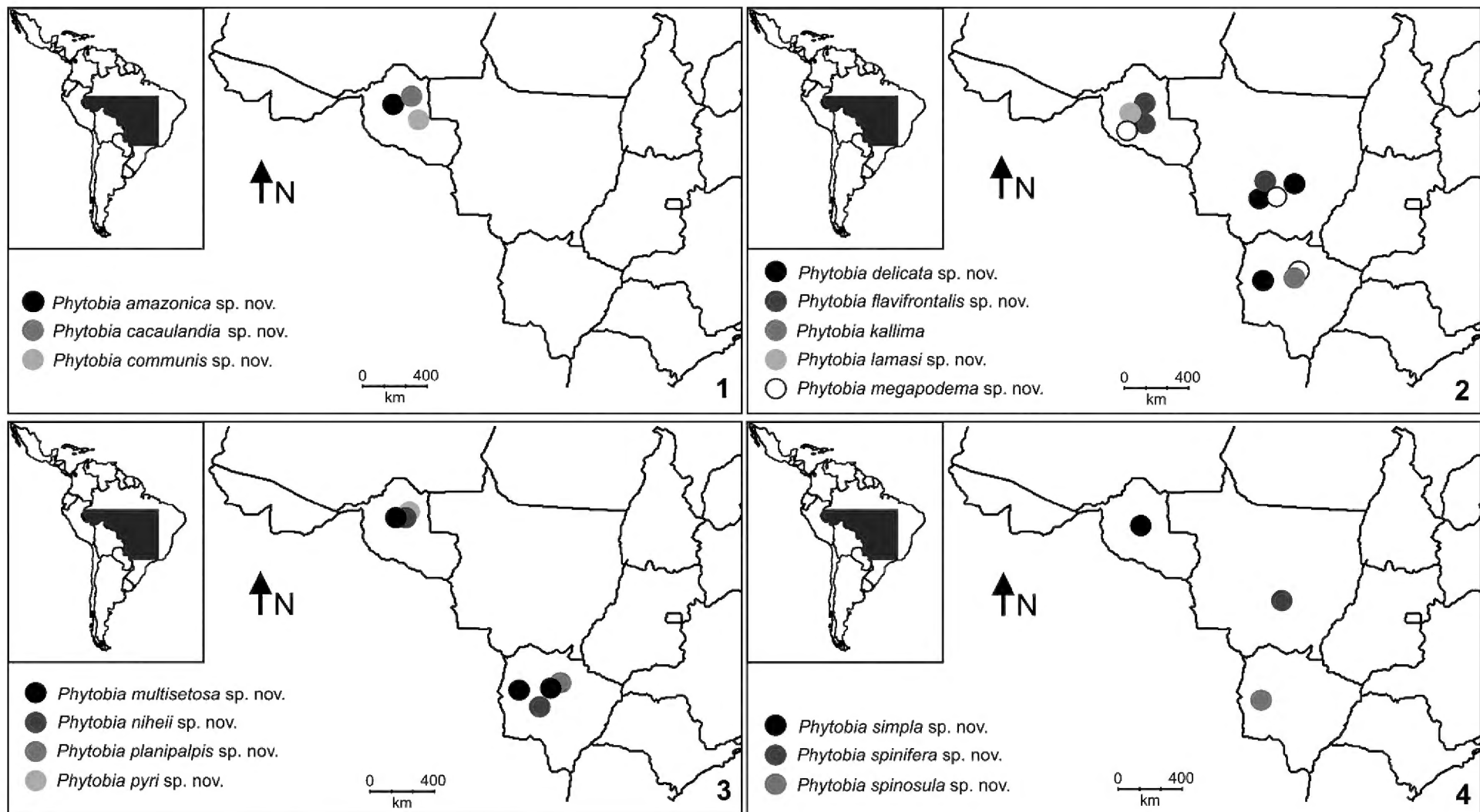
<http://zoobank.org/63C7585F-A5C8-43B0-8861-824D64C613CD>
 Figs 1, 5, 26, 36–38

Type material. Holotype ♂: BRASIL, RO [Rondônia]: Campo Novo. Fazenda Amorim. 10°40'6"S, 63°29'0"W – 248m, Malaise, 03–15.xii.2011, Amorim, Ament & Riccardi cols. [MZUSP] (Fig. 1).

Description. Male. Body length 2.0 mm; wing length 2.2 mm (Fig. 5).

Female. Unknown.

Color. Frons mat black; fronto-orbital plate black, weakly shining; upper dark orbit touching ovt and ivt; ocellar triangle black, greyish pollinose; lunule silvery; face greyish-brown; clypeus black subshining; gena dark brown; scape and pedicel brown; first flagellomere dark brown; arista and palpus brown; proboscis and labellum yellow, with yellow setae; scutum slightly shining black, with yellow area before scutellum and forming two distinct bands divided by narrow yellow stripe (Fig. 26); scutellum light yellow; postpronotum light yellow, with brown small basal spot; notopleuron and anepimeron light yellow; anepisternum light yellow, with brown area at base; katapisternum light yellow, katapisternum and meron brown; haltere entirely light yellow; calypters light yellow, with margin and fringe black; wing clear; legs brown with fore knees brownish-yellow; pulvilli yellow; abdomen yellow, with brown middle stripe on tergite 5 and tergite 6; terminalia brown.



Figures 1–4. Map of the collecting localities in Brazil: (1) *Phytobia amazonica* sp. nov., *P. cacauplandia* sp. nov., *P. communis* sp. nov.; (2) *P. delicata* sp. nov., *P. flavifrontalis* sp. nov., *P. kallima* (Frost), *P. lamasi* sp. nov., *P. megapodema* sp. nov.; (3) *P. multisetosa* sp. nov., *P. niheii* sp. nov., *P. planipalpis* sp. nov., *P. pyri* sp. nov.; (4) *P. simpla* sp. nov., *P. spinifera* sp. nov., *P. spinosula* sp. nov.

Head. Frons slightly visible above eye margin in lateral profile; 2 reclinate ors and 2 inclinate ori, similar in size; orbital setulae slightly reclinate in one row; facial keel differentiated, extending to bases of antennae, slightly widening below; eye height/para-facialia+gena: 5; ocellar triangle short, ending before second ors; lunule high, about 20% of frons length; clypeus rounded; epistoma height 0.06 mm; first flagellomere rounded and finely pubescent; arista long, almost same vertical height of eye, finely pubescent; vibrissa long and strong, measuring half of arisal length.

Thorax. Acr in eight irregular rows; prsc absent; 1+3 dc, first presutural broken, second and third long, last one a little stronger; 2 npl, posterior one shorter. Wings. Wing tip nearer to R_{4+5} than to M; R_{4+5} and M slightly recurved; C sections 2–4 in proportion: 0.58: 0.23: 0.17; ultimate section of CuA_1 0.8 length of basal section; r-m basal to midpoint of dm. Legs. Fore tibia without pd, mid tibia with 3 pd on middle third.

Terminalia. Epandrium rounded with long setae and two strong spines at base; cercus long, 2/3 height of epandrium, setulose with distinct seta at apex; postgonite with three basal setae in ventral view; surstylus with 10–11 setae; hypandrium U-shaped; phallapodeme about three times length of hypandrium; mesophallus bulb-shaped; distiphallus short, with same length of mesophallus and sclerotized at base (Figs 36, 37); ejaculatory apodeme very broad, at its broader part about 4.5 times wider than constricted area at base (Fig. 38).

Distribution. Rondônia (Brazil).

Etymology. The specific epithet refers to the Amazonian Rain Forest biome, where the species was found.

Remarks. This new species differs from congeners by the chaetotaxy of the mid tibia with 3 pd median setae, postgonite with three basal setae, surstylus with 10–11 setae, distiphallus with median constriction, and ejaculatory apodeme very broad.

Phytobia cacauplandia sp. nov.

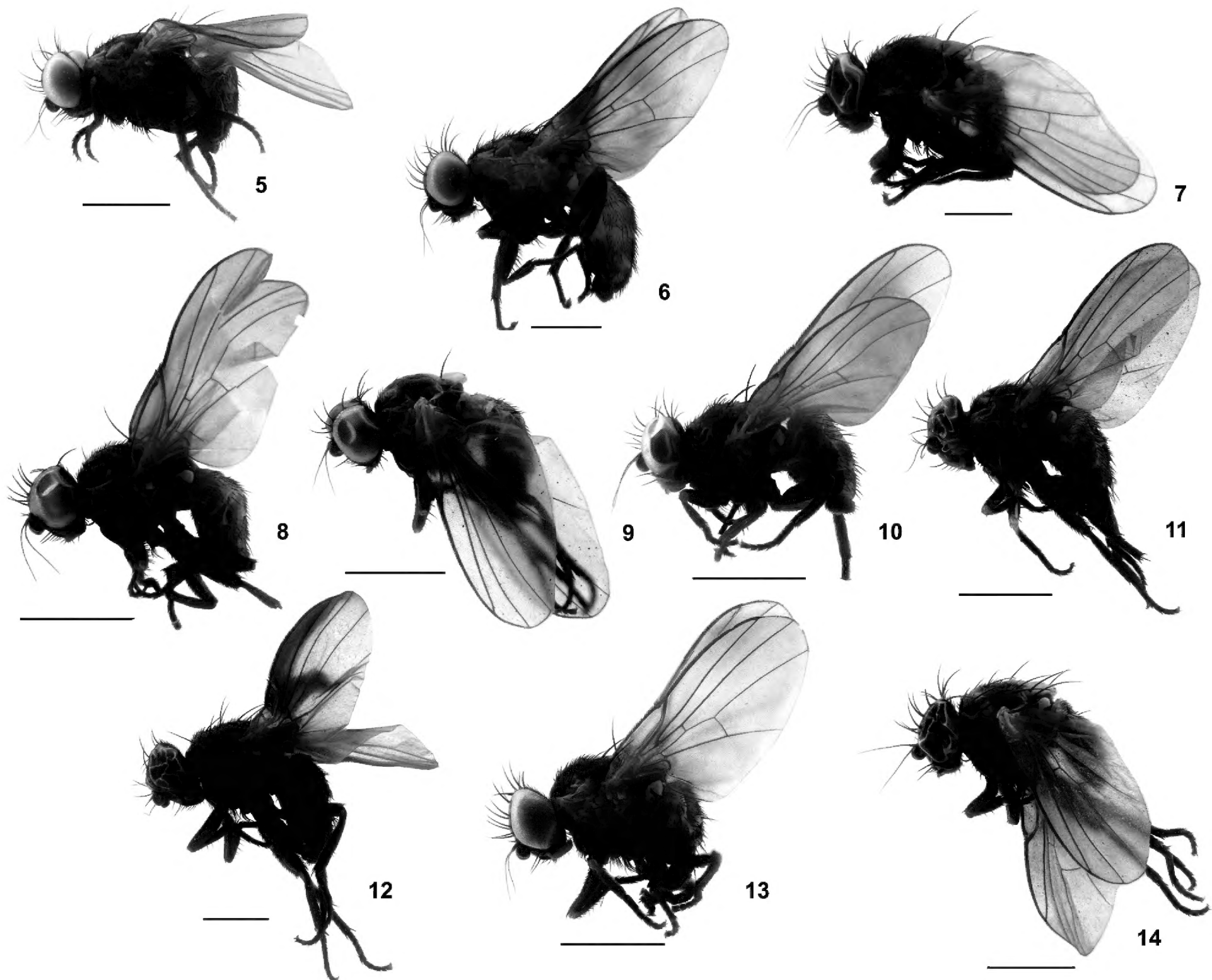
<http://zoobank.org/8735B5B8-050E-44CA-A4DD-9C23C0A6C688>
Figs 1, 6, 27, 39–41

Type material. Holotype ♂: BRASIL, RO [Rondônia]: Cacauplandia. Cachoeira do Jamari. 10°13'26.8"S, 63°13'49.0"W – 131m. 22.v.2012. Sousa, V.R. col. [MZUSP] (Fig. 1).

Description. Male. Body length 3.3 mm; wing length 2.9 mm (Fig. 6).

Female. Unknown.

Color. Frons mat black; fronto-orbital plate and ocellar triangle weakly shining black; upper dark orbit touching ovt and ivt; lunule yellowish-silvery; face greyish-brown; clypeus shiny black; gena dark brown; antenna entirely dark brown; arista and palpus brown; proboscis brownish-yellow; labellum brownish-yellow, with light setae; scutum mat black, with yellow



Figures 5–14. Adults, lateral view: (5) *Phytobia amazonica* sp. nov., holotype male; (6) *P. cacaulandia* sp. nov., holotype male; (7) *P. communis* sp. nov., holotype male; (8) *P. delicata* sp. nov., holotype male; (9) *P. delicata* sp. nov., female; (10) *P. flavifrontalis* sp. nov., holotype male; (11) *P. flavifrontalis* sp. nov., female; (12) *P. kallima* (Frost), male; (13) *P. lamasi* sp. nov., holotype male; (14) *P. megapodema* sp. nov., holotype male. Scale bars: 1 mm.

area before scutellum, forming one short band divided by narrow yellow stripe (Fig. 27); scutellum light yellow; postpronotum, notopleuron, and anepimeron light yellow; anepisternum light yellow, brown in lower part; katepimeron light yellow; katepisternum brown with upper part light yellow; meron brown; haltere entirely yellow; calypters light yellow, with margin and fringe black; wing slightly infuscate with brown area above Sc and in cup cell; legs brown with fore and mid knees brownish-yellow; pulvilli yellow; abdomen yellow, with brown median stripe on tergites 5 and 6; terminalia dark brown.

Head. Frons not visible above eye margin in lateral profile; 2 reclinate ors and 2 inclined inwards ori, similar in size;

orbital setulae slightly reclinate, in one row; facial keel not differentiated; eye height/parafacialia+gena: 12; ocellar triangle short, ending to second ors; lunule very high, about 40% of frons length; clypeus rounded; epistoma height 0.04 mm; first flagellomere rounded and finely pubescent; arista long, almost same vertical height of eye, finely pubescent; vibrissa strong, measuring 2/3 of arisal length.

Thorax. Acr in seven irregular rows; prsc absent; 1+3 dc, third longer and stronger than others; 2 npl, similar in size. Wings. Wing tip between R_{4+5} and M; R_{4+5} and M straight; C sections 2–4 in proportion: 0.61: 0.22: 0.16; ultimate section of CuA_1 0.55 length of basal section; r-m distal to midpoint of dm.

Legs. Fore tibia with 1 pd; mid tibia with 2 pd on middle third.

Terminalia. Epandrium rounded, setulose, with long setae; cercus long, large, about 1/3 height of epandrium and with small and thin setae; surstylus short, rounded, with about 11–13 long and strong setae; hypandrium U-shaped; phallapodeme about three times length of hypandrium; basiphallus rounded; distiphallus short (Figs 39, 40); ejaculatory apodeme with lower blade broader than base, broader part about 1.9 times wider than constricted area at base (Fig. 41).

Distribution. Rondônia (Brazil).

Etymology. The specific epithet refers to the type locality, Cacaúlândia, where the holotype was collected.

Remarks. This new species has a singularly infuscated wing with a brown area above Sc and in cup cell. This pattern has not been seen in any other species of *Phytobia*. The wing of *P. lanei* Spencer, 1966 is conspicuously spotted and the wing of *P. rabelloi* Spencer, 1966 is fully infuscated. In addition, *P. cacaúlândia* sp. nov. can also be distinguished from other species in the length of the wing, 2.9 mm (5.1 mm in *P. lanei*), number of dorsocentrals 1+3 (1+4 in *P. rabelloi*), the shape of the phallus, and the ejaculatory apodeme with lower blade broader than base. This species also has a distinct pd on fore tibia.

Phytobia communis sp. nov.

<http://zoobank.org/425F5542-ED00-459F-BCE6-BAF14A215E35>
 Figs 1, 7, 28, 42–44

Type material. Holotype ♂: BRASIL, RO [Rondônia], Campo Novo, Fazenda Amorim 10°40'6"S, 63°29'0"W – 248m. Malaise trap. 03–15.xii.2011, Amorim, Ament & Riccardi cols. [MZUSP]. Paratypes: same data as holotype, 2 ♂ [MZUSP], 2 ♂ [MNRJ] (Fig. 1).

Description. Male. Body length 1.9–2.4 mm; wing length 2.1–2.3 mm (Fig. 7).

Female. Unknown.

Color. Frons and fronto-orbital plate mat black, with lower half reddish-brown; upper dark orbit touching ovt and ivt; ocellar triangle mat black, grey pollinose; lunule silver brown; face brown; clypeus shining black; gena brown; antenna entirely orange brown; arista brown; palpus yellow, with black setae apically; proboscis yellow; labellum yellow, with yellow setae; scutum brown, grey pollinose presuturally, with transverse band brown weakly shining postsuturally, light yellow laterally and before scutellum (Fig. 28); scutellum light yellow; postpronotum light yellow, with brown spot centrally; notopleuron light yellow; anepimeron, anepisternum, katepimeron, katepisternum, and meron brownish-black; haltere entirely light yellow; calypters yellow, with margin and fringe brown; wing clear, light yellow at base; legs dark brown, with fore knees yellow; pulvilli yellow; abdomen light yellow, tergites 3–6 with median dark brown spot, tergite 5, tergite 6 with lateral dark brown spot; terminalia entirely dark brown.

Head. Frons not visible above eye margin in lateral profile; 2 reclinate ors and 2 inclinate inwards ori, similar in size; orbital setulae erect in one row; facial keel undifferentiated; eye height/parafacialia+gena: 4; ocellar triangle short, ending before second ors; lunule high, about 28% of frons length; clypeus rounded; epistoma height 0.04 mm; first flagellomere rounded and finely pubescent; arista long, almost same vertical height of eye, finely pubescent; vibrissa long and strong, measuring 2/3 of arisal length.

Thorax. Acr in eight irregular rows; prsc absent; 1+3 dc, presutural and first postsutural shorter than second and third; 2 npl, similar in size. Wings. Wing tip nearer R_{4+5} than M; R_{4+5} and M straight; C sections 2–4: 0.72:0.16:0.12; ultimate section of CuA_1 with same length of basal section; r-m distal to midpoint of dm. Legs. Fore tibia without pd; mid tibia with 2 pd on middle third.

Terminalia. Epandrium rounded with long setae; cercus short, about 1/3 height of epandrium, with long setae; surstylus rounded, triangular on apex, with about 32 setae; hypandrium short and U-shaped; phallapodeme about 2.5 length of hypandrium; mesophallus well sclerotized, V-shaped; distiphallus sclerotized with two arms, with membrane surrounding it (Figs 42, 43); ejaculatory apodeme small, at its broader part about 4.0 times wider than constricted area at base (Fig. 44).

Distribution. Rondônia (Brazil).

Etymology. The specific epithet refers to the common characters showed by the species within the genus, except the male terminalia.

Remarks. This new species is morphologically similar to *P. megapodema* sp. nov. in the length of the body and wing and in the general color of the body, but it can be differentiated by the antennae entirely orange brown; surstylus with about 32 setae, distiphallus well sclerotized with two arms and short ejaculatory apodeme.

Phytobia delicata sp. nov.

<http://zoobank.org/EE2FE185-30A1-4DCB-B083-4B26D0D9FF2E>
 Figs 2, 8, 9, 29, 45–49

Type material. Holotype ♂: BRASIL: MT [Mato Grosso], Chapada dos Guimarães (cerrado) – Trilha da Cach. Andorinha. 15°20'33.37"S, 056°47'37.16"W. Coleta ativa. 17.i.2013. Lamas, Nihei & Eq. cols. Paratypes: 1 ♀, Trilha da Pedra – final (mirante). 15°24'21.8"S, 055°50'07.5"W. Malaise 22. 17.i-09.iii.2012; 1 ♀, BRASIL, MS [Mato Grosso do Sul]: Corumbá, BEP – Mata Ciliar, Rio Miranda, 76m. 19°34'30.06"S, 57°00'52.4"W. 18.ix-03.x.2011. Malaise 03. Lamas, Nihei & eq. cols.; 2 ♀ Corumbá, BEP, Paratudal, 104m. 19°34'11.4"S, 57°01'08.5"W. 02.xi-02.xii.2011. Malaise 01. Lamas, Nihei & Eq. col.; 2 ♀, 01–16.viii.2012. [all in MZUSP] (Fig. 2).

Description. Male. Body length 1.8 mm; wing length 1.7 mm (Fig. 8).

Female. Body length 2.1–2.2 mm; wing length 1.9–2.2 mm (Fig. 9).

Color. Frons mat black; fronto-orbital plate shining black; upper shiny dark orbit touching ovt and ivt; ocellar triangle mat black; lunule silvery; face greyish-black; clypeus black subshining; gena brown; antenna and arista entirely brown; palpus brown; proboscis yellow; labellum yellow, with yellow setae; scutum weakly shining brown, light yellow laterally and before scutellum, black in area of scutum not reaching scutellum and forming two distinct bands divided by narrow yellow stripe (Fig. 29); scutellum light yellow, with sub-basal lateral brown spot; postpronotum light yellow, with basal brownish spot; notopleuron and anepimeron light yellow; anepisternum light yellow, with small brown spot on basal half; katepimeron light yellow, katepisternum and meron brown; haltere entirely yellow; calypters light yellow, with margin and fringe brown; wing clear, light yellow at base; legs brown with all knees yellow; pulvilli light yellow; abdomen yellow, tergite 5 and tergite 6 with median brown stripe touching at limit of tergites; terminalia entirely brown.

Head. Frons slightly visible above eye margin in lateral profile; 2 reclinate ors and 2 inclinate inwards ori, first ori more inclinate than second ori and slightly thinner and shorter than others; orbital setulae slightly reclinate in one row; facial keel undifferentiated; eye height/parafacialia+gena: 6; ocellar triangle short, ending shortly after second ors; lunule a little high, about 16% of frons length; clypeus obtuse; epistoma height 0.02 mm; first flagellomere rounded and finely pubescent; arista long, same size vertical height of eye, finely pubescent; vibrissa short and thin, measuring about 1/3 of arisal length.

Thorax. Acr in six irregular rows; prsc absent; 1+3 dc, presutural thinner and shorter than others, second broken, third and fourth long and strong; 2 npl, similar in size. Wings. Wing tip nearer R_{4+5} than to M; R_{4+5} and M erect; C sections 2–4: 0.72:0.18:0.09; ultimate section of CuA_1 0.9 length of basal section; r-m basal to midpoint of dm. Legs. Fore tibia without pd; mid tibia with 2 pd on middle third.

Terminalia. Epandrium rounded with long setae; cercus long, slightly more than 2/3 height of epandrium and with long setae and 2 distinct at apex; surstylus rounded with about 11–19 setae; hypandrium U-shaped; phallapodeme about 2.5 times length of hypandrium; basiphallus and distiphallus membranous; distiphallus membranous, sclerotized centrally (Figs 45, 46); ejaculatory apodeme broad, at its broader part about 3.7 times wider than constricted area at base (Fig. 47). Oviscape (Fig. 48). Spermathecae (Fig. 49).

Distribution. Mato Grosso and Mato Grosso do Sul (Brazil).

Etymology. The specific epithet refers to the membranous and delicate phallus.

Remarks. *Phytobia delicata* sp. nov. is morphologically similar to *P. spinifera* sp. nov. in external characters and coloration of the body, but can be differentiated by the rounded surstylus with about 11–19 setae and distiphallus membranous, sclerotized centrally.

Phytobia flavifrontalis sp. nov.

<http://zoobank.org/8786200C-AB8A-4F68-B10F-A674122E7732>
Figs 2, 10, 11, 30, 50–54

Type material. Holotype ♂: BRASIL, RO [Rondônia]: Monte Negro. Setor Chacareiro. 10°16'21.4"S, 63°20'45.4"W – 186m. 20.v.2012. Sousa, V.R. col. [MZUSP]. Paratypes: 1 ♂, Campo Novo. Fazenda Amorim. 10°40'6"S, 63°29'0"W – 248m. Malaise. 03–15.xii.2012. Amorim, Ament & Riccardi cols. [MNRJ]; 1 ♂, BRASIL, MT [Mato Grosso]: Chapada dos Guimarães (Cerrado) – Trilha da Pedra – final (mirante). 15°24'21.8"S, 055°50'07.5"W. Malaise 22. 17.i-09.iii.2012. Lamas, Nihei & Eq. cols. [MNRJ]; 1 ♀, Parque Nacional Chapada dos Guimarães. Cachoeira Véu de Noiva – Mata ciliar. 15°24'33.4"S, 55°49'54.1"W. Malaise 45. 20.ix-31.x.2012. Lamas, Nihei & Eq. cols. [MZUSP] (Fig. 2).

Description. Male. Body length 1.7 mm; wing length 1.9 mm (Fig. 10).

Female. Body length 2.3 mm; wing length 2.0 mm (Fig. 11).

Color. Frons egg yellow in lower half and yellow with pollinose silver on upper half; fronto-orbital plate yellow; upper dark orbit touching ovt and yellowish in ivt; ocellar triangle brownish-black; lunule and face greyish-yellow; clypeus dark subshining; gena yellow; scape and pedicel dark brown, first flagellomere dark brown, orange anteriorly; arista brown; palpus yellow, with black and yellow setae apically; proboscis yellow; labellum yellow, with yellow setae; scutum brown, grey pollinose, light greyish-yellow before scutellum (Fig. 30); scutellum light greyish-yellow, with one brown spot laterally on basal middle; postpronotum and notopleuron light yellow; anepimeron and anepisternum brown anteriorly and yellow posteriorly; katepimeron light yellow, katepisternum dark brown, yellowish on upper part; meron dark brown with yellow transversal band upperly; haltere entirely yellow; calypters light yellow, with margin and fringe black; wing clear, yellow at base; legs dark brown, with fore knees yellow; pulvilli yellow; abdomen yellow, tergite 5 with brown median spot, tergite 6 with brown median stripe and brown lateral round spot; terminalia entirely brown.

Head. Frons not visible above eye margin in lateral profile; 2 reclinate ors and 2 inclinate inwards ori, ori slightly thinner and shorter than ors; orbital setulae thin and short, slightly reclinate in one row; facial keel undifferentiated; eye height/parafacialia+gena: 5.5; ocellar triangle short, ending before second ors; lunule a little high, about 14% of frons length; clypeus rounded; epistoma height 0.01 mm; first flagellomere rounded and finely pubescent; arista long, slightly longer than vertical height of eye, finely pubescent; vibrissa short and strong, measuring about 1/3 of arisal length.

Thorax. Acr in seven irregular rows; prsc absent; 1+3 dc, increasing size from presutural to third postutural; 2 npl, similar in size. Wings. Wing tip between R_{4+5} and M; R_{4+5} and M straight; C sections 2–4: 0.66:0.16:0.16; ultimate section of CuA_1 0.8

length of basal section; r-m at midpoint of dm. Legs. Fore tibia without pd; mid tibia with 2 pd on middle third.

Terminalia. Epandrium rounded with long setae; cercus long, about 2/3 height of epandrium and with long setae; postgonite with basal seta in ventral view; surstylus rounded with about 11–18 setae; hypandrium U-shaped; phallapodeme about 2.5 times length of hypandrium; distiphallus as in Figs 50 and 51; ejaculatory apodeme broad, at its broader part about 4.1 times wider than constricted area at base (Fig. 52). Oviscape (Fig. 53). Spermathecae (Fig. 54).

Distribution. Rondônia and Mato Grosso (Brazil).

Etymology. The specific epithet refers to the egg-yellow frons of the species.

Remarks. This new species resembles *P. pipinna* (Sasakawa, 1992) from Peru in the yellow coloration of the body, but can be differentiated by the short wing and body length, scape and pedicel dark brown, frons conspicuously egg yolk yellow in lower half and yellow silver pollinose on upper half, one seta on postgonite, surstylus with about 11–18 setae, phallus shape, and the broad ejaculatory apodeme.

Phytobia kallima (Frost, 1936)

Figs 2, 12, 55–57

Phytobia kallima, Spencer, 1967: 83.7 (catalogue); Martinez and Étienne 2002: 43 (list)

Phytobia (Phytobia) kallima, Frick 1952: 390; 1959: 375

Agromyza kallima Frost, 1936: 299

Material examined. 1 ♂, BRASIL, MS [Mato Grosso do Sul]: Corguinho, Taboco, Reserva Quinta do Sol. 19°46'45.4"S, 55°14'36.2"W. 12–29.viii.2012. Malaise 13. Lamas, Nihei & eq. cols. [MZUSP] (Fig. 2).

Redescription. Male. Body length 3.2 mm; wing length 2.6 mm (Fig. 12).

Female. Unknown.

Color. Frons mat black; fronto-orbital plate shining black; upper dark orbit touching ovt and ivt; ocellar triangle mat black; lunule silvery; face brown with grey pollinose; clypeus black, slightly shiny; gena dark brown; antenna and arista entirely brown; palpus brown; proboscis light brown; labellum light brown, with brown setae; scutum dark brown, weakly shining; scutellum dark brown; postpronotum, notopleuron, anepimeron, anepisternum, katepimeron, katepisternum, and meron dark brown; haltere entirely light yellow; calypters light yellow with margin and fringe brown; upper fourth of wing brown and with brown area from radial sector reaching transversal r-m and dm-cu veins; legs dark brown; pulvilli yellow; abdomen entirely dark brown.

Head. Frons strongly visible above eye margin in lateral profile; 2 ors, first broken, second reclinate; 2 slightly reclinate ori, ori shorter and thinner than ors; orbital setulae slightly reclinate in one row; facial keel undifferentiated; eye height/

parafacialia+gena: 3; ocellar triangle short, ending before second ors; lunule high, about 30% of frons length; clypeus obtuse; epistoma height 0.04 mm; first flagellomere rounded and finely pubescent; arista long, about 2/3 of vertical height of eye, finely pubescent; vibrissa strong, measuring half of arista length.

Thorax. Acr in eight irregular rows; prsc present; 1+3 dc, increasing in size from presutural to third postsutural; 2 npl, similar in size. Wings. Wing tip between R_{4+5} and M; R_{4+5} and M slightly recurved; C sections 2–4: 0.68:0.15:0.15; ultimate section of CuA_1 0.44 length of basal section; r-m distal to midpoint of dm, close to limit of apical third. Legs. Fore tibia without pd; mid tibia with 2 pd on middle third.

Terminalia. Epandrium large and rounded with long setae; cercus short, slightly less than 1/3 height of epandrium and with long setae and one distinct at apex; surstylus oblong and large with about 23–32 setae; hypandrium U-shaped; phallapodeme about twice length of hypandrium; mesophallus tubular; distiphallus as in Figs 55 and 56; ejaculatory apodeme broad, at its broader part about 3.3 times wider than constricted area at base (Fig. 57).

Distribution. Panama, Mato Grosso do Sul (Brazil). New record from Brazil.

Remarks. *Phytobia kallima* was described by Frost (1936) based only on external characters. Here we provide the first description of the male terminalia. It was previously known from Panama and differs from the other species by the conspicuously pictured wing and by the shape of the phallus, besides the broad ejaculatory apodeme.

Phytobia lamasi sp. nov.

<http://zoobank.org/BA8CEDF4-052E-4E49-993E-512DABA3E618>

Figs 2, 13, 31, 58–60

Type material. Holotype ♂: BRASIL, RO [Rondônia]: Campo Novo. Fazenda Amorim. 10°40'6"S, 63°29'0"W – 248m, Malaise trap 6m, 03–15.xii.2011, Amorim, Ament & Riccardi cols. Paratypes: same data as holotype, 1 ♂ [MZUSP], 2 ♂ [MNRJ] (Fig. 2).

Description. Male. Body length 2.4–2.5 mm; wing length 1.9–2.0 mm (Fig. 13).

Female. Unknown.

Color. Frons mat black; fronto-orbital plate black, weakly shining; upper dark orbit touching ovt and ivt ocellar triangle black, greyish pollinose; lunule silvery; face greyish-brown; clypeus black subshining; gena dark brown; scape and pedicel brown; first flagellomere dark brown; arista and palpus brown; proboscis and labellum yellow, with yellow setae; scutum weakly shining black, with yellow area before scutellum (Fig. 31); scutellum light yellow; postpronotum light yellow, with brown small basal spot; notopleuron and anepimeron light yellow; anepisternum light yellow, with brown area at base; katepimeron light yellow, katepisternum and meron brown; haltere entirely

light yellow; calypters light yellow, with margin and fringe black; wing clear; legs brown with fore knees brownish-yellow; pulvilli yellow; abdomen yellow, with brown stripe on tergites 3–5, tergite 6 almost entirely brown; terminalia brown.

Head. Frons not visible above eye margin in lateral profile; 2 reclinate ors and 2 inclinate inwards ori, similar in size; orbital setulae slightly reclinate in one row; facial keel undifferentiated; eye height/parafacialia+gena: 4.5; ocellar triangle short, ending before second ors; lunule high, about 23% of frons length; clypeus rounded; epistoma height 0.03 mm; first flagellomere rounded and finely pubescent; arista long, almost same vertical height of eye, finely pubescent; vibrissa short and strong, 1/3 of arisal length.

Thorax. Acr in eight irregular rows; prsc absent; 1+3 dc, presutural short and thin first postsutural broken, second and third long and strong; 2 npl, similar in size. Wings. Wing tip between R_{4+5} and M; R_{4+5} and M slightly recurved; C sections 2–4: 0.66:0.2:0.13; ultimate section of CuA_1 0.85 length of basal section; r-m basal to midpoint of dm. Legs. Fore tibia without pd (present in one paratype); mid tibia with 2 pd on middle third.

Terminalia. Epandrium rounded with long setae; cercus short, about 1/3 height of epandrium, setulose and with 4 distinct long apical setae; postgonite with 3–4 short setae at apex; surstylus rounded, with about 12 setae; hypandrium U-shaped; phallapodeme about twice length of hypandrium; mesophallus simple and straight; distiphallus rounded with two sclerotized areas centrally (Figs 58, 59); ejaculatory apodeme broad, at its broader part about 3.3 times wider than constricted area at base (Fig. 60).

Distribution. Rondônia (Brazil).

Etymology. The specific epithet is in honor of Dr. Carlos Einicker Lamas (Museu de Zoologia, Universidade de São Paulo) in recognition of his great contribution to the Brazilian Diptera fauna knowledge.

Remarks. This new species resembles *P. spinifera* sp. nov. and *P. delicata* sp. nov. in the general coloration of the body and chaetotaxy, but can be distinguished from them by the yellow abdomen with a brown stripe on tergites 3–5 and tergite 6 almost entirely brown. It also differs by the presence of 3–4 short setae at apex of postgonite, surstylus with about 12 setae, and distiphallus rounded with two sclerotized areas centrally.

Phytobia megapodema sp. nov.

<http://zoobank.org/058154B8-CA69-4510-BD9E-C950DEA13160>
Figs 2, 14, 15, 32, 61–65

Type material. Holotype ♂: BRASIL: MS [Mato Grosso do Sul]: Corguinho, Taboco, Reserva Quinta do Sol. 19°46'45.4"S, 55°14'36.2"W. 29.viii-12.ix.2012. Malaise 13. Lamas, Nihei & eq. cols. Paratypes: same data as holotype, 1 ♀ [MZUSP]; 1 ♀, 12–29. viii.2012 [MNRJ]; 1 ♂, BRASIL: MT [Mato Grosso]: Chapada dos

Guimarães. Mata ciliar – Cachoeira Vêu da Noiva. 15°24'33.4"S, 055°49'54.1"W. Malaise 45. 09.vii-09.viii.2012. Lamas, Nihei & eq. cols. [MNRJ]; 1 ♂, BRASIL: RO [Rondônia]: Campo Novo. Fazenda Amorim. 10°40'6"S, 63°29'0"W – 248m. Malaise. 03–15. xii.2011. Amorim, Ament & Riccardi cols. [MZUSP] (Fig. 2).

Description. Male. Body length 2.4 mm; wing length 2.25 mm (Fig. 14).

Female. Body length 2.7 mm; wing length 2.4 mm (Fig. 15).

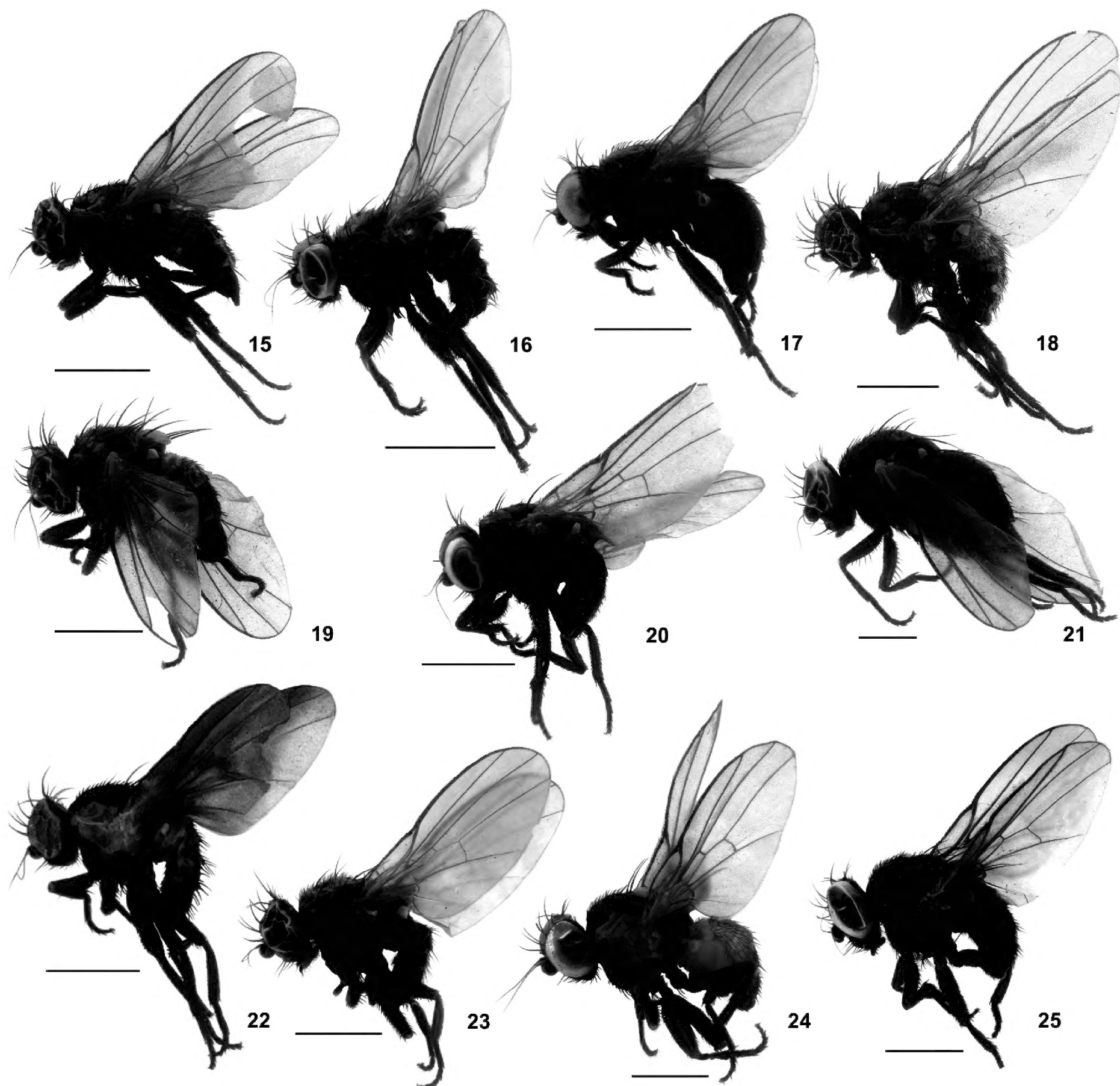
Color. Frons mat black, more brownish at base; fronto-orbital plate shining black; upper dark orbit touching ovt and ivt; ocellar triangle mat black; lunule silvery; face black with grey pollinose; clypeus mat black; gena dark brown; scape and pedicel brown; first flagellomere brown, light brown apically; arista and palpus brown; proboscis light brown; labellum light brown, with yellow setae; scutum dark brown, grey pollinose, light yellow before scutellum (Fig. 32); scutellum light yellow, with sub-basal lateral brown spot; postpronotum light yellow, brown on basal half; notopleuron light yellow; anepimeron brown; anepisternum dark brown, yellow posteriorly; katepimeron, katepisternum, and meron dark brown; haltere entirely yellow; calypters light yellow with margin and fringe black; wing clear, yellow at base; legs brown with all knees yellow; pulvilli yellow; abdomen yellow, tergites 3–6 with median brown stripe and two brown spots laterally; terminalia brown.

Head. Frons not visible above eye margin in lateral profile; 2 ors and 2 ori, all reclinate and similar in size; orbital setulae erect in one row; facial keel undifferentiated; eye height/parafacialia+gena: 0.6 mm; ocellar triangle short, extending before second ors; lunule high, 23% of frons length; clypeus rounded; epistoma height 0.05 mm; first flagellomere rounded and finely pubescent; arista long, slightly longer than vertical height of eye, finely pubescent; vibrissa short and strong, measuring about 1/3 of arisal length.

Thorax. Acr in nine irregular rows; prsc absent; 1+3 dc, presutural and first postsutural shorter than two others; 2 npl, similar in size. Wings. Wing tip between R_{4+5} and M; R_{4+5} and M slightly recurved; C sections 2–4 in proportions: 0.64:0.17:0.17; ultimate section of CuA_1 with same length of basal section; r-m distal to midpoint of dm. Legs. Fore tibia without pd; mid tibia with 2 pd on middle third.

Terminalia. Epandrium large and rounded with long setae; cercus short, about 1/3 height of epandrium and with long setae and 2 at apex; postgonite with three basal setae in ventral view; surstylus triangular with about 38 setae; hypandrium U-shaped; phallapodeme about 2.5 times length of hypandrium; mesophallus tubular basally and enlarged to distal end; distiphallus very complex, as in Figs 61, 62; ejaculatory apodeme very broad, its broader part about 4.0 times wider than constricted area at base (Fig. 63). Oviscape (Fig. 64). Spermathecae (Fig. 65).

Distribution. Rondônia, Mato Grosso, and Mato Grosso do Sul (Brazil).



Figures 15–25. Adults, lateral view: (15) *Phytobia megapodema* sp. nov., female; (16) *P. multisetosa* sp. nov., holotype male, (17) female; (18) *P. niheii* sp. nov., holotype male, (19) female; (20) *P. planipalpis* sp. nov., holotype male; (21) *P. planipalpis* sp. nov., female; (22) *P. pyri* sp. nov., holotype male; (23) *P. simpla* sp. nov., holotype male; (24) *P. spinifera* sp. nov., holotype male; (25) *P. spinosula* sp. nov., holotype male. Scale bars: 1 mm.

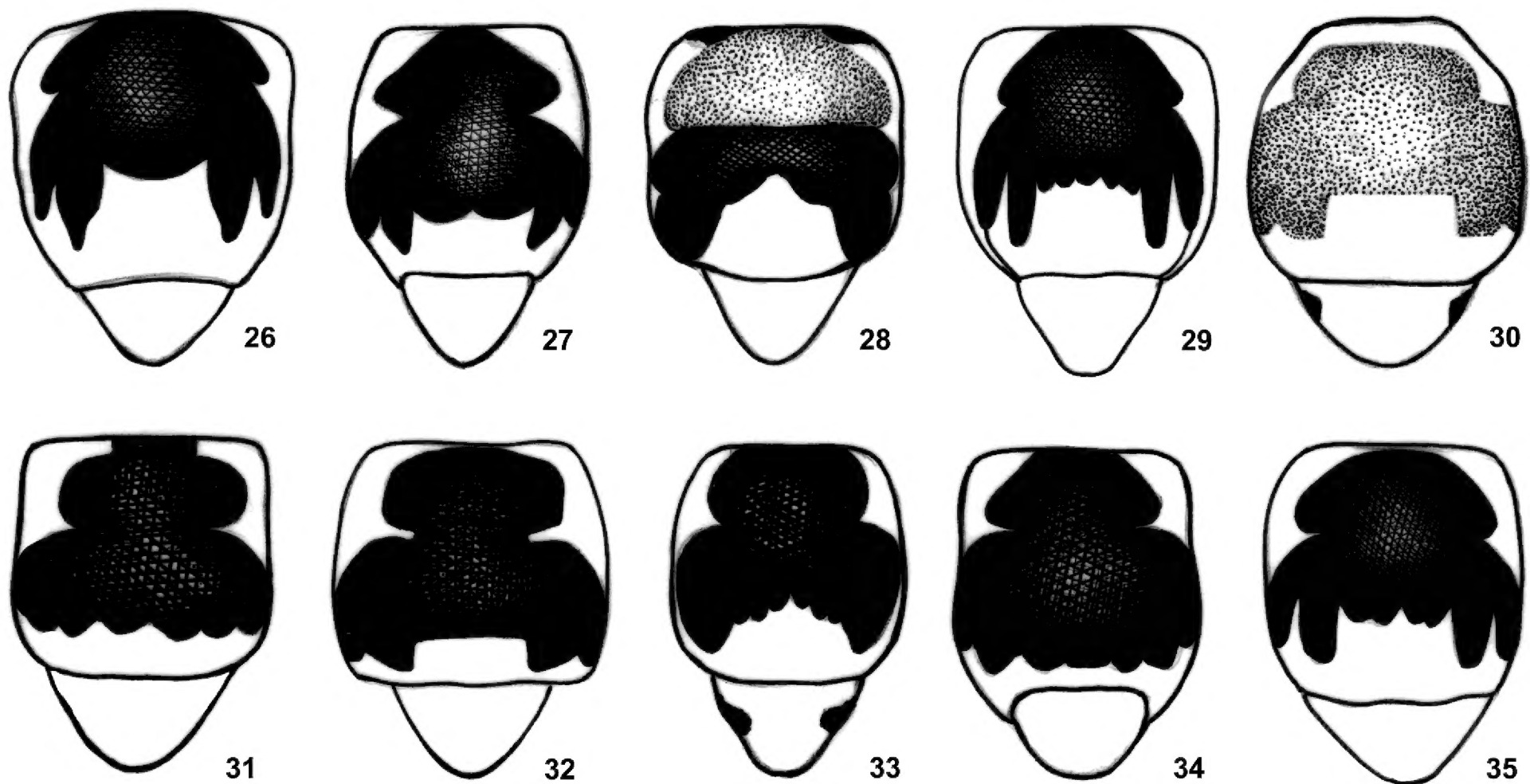
Etymology. The specific epithet refers to the large size of the ejaculatory apodeme.

Remarks. This new species is morphologically similar to *P. communis* sp. nov. in body and wing length and in the general coloration, but it can be distinguished by the scape and pedicel brown, surstylus triangular with about 38 setae, distiphallus very complex, and very broad ejaculatory apodeme.

Phytobia multisetosa sp. nov.

<http://zoobank.org/52A575D5-619B-485A-B8B6-430D2C082B71>
Figs 3, 16, 17, 66–70

Type material. Holotype ♂: BRASIL, RO [Rondônia]: Campo Novo. Fazenda Amorim 10°40'6"S, 63°29'0"W – 248m. Malaise trap 6m, 03–15.xii.2011. Amorim, Ament & Riccardi



Figures 26–35. Color pattern of the scutum: (26) *Phytobia amazonica* sp. nov.; (27) *P. cacauplandia* sp. nov.; (28) *P. communis* sp. nov.; (29) *P. delicata* sp. nov.; (30) *P. flavifrontalis* sp. nov.; (31) *P. lamasi* sp. nov.; (32) *P. megapodema* sp. nov.; (33) *P. niheii* sp. nov.; (34) *P. pyri* sp. nov.; (35) *P. spinifera* sp. nov.

cols. [MZUSP]. Paratypes: same data as holotype, 3 ♂ [MZUSP]; 4 ♂ [MNRJ]; 1 ♂, BRASIL, MS [Mato Grosso do Sul]: Corguinho, Taboco. Reserva Quinta do Sol. 19°46'36.8"S, 055°14'55.7"W. Malaise 14. 29.viii-12.ix.2012. Lamas, Nihei & Eq. cols. [MZUSP]; 1 ♀, Corumbá. B.E.P. Paratidal. 19°34'11.04"S, 057°01'08.5"W. Malaise 01. 01–16.viii.2012. Lamas, Nihei & eq. cols. [MZUSP] (Fig. 3).

Description. Male. Body length 2.9 mm; wing length 2.1 mm (Fig. 16).

Female. Body length 2.0 mm; wing length 1.3 mm (Fig. 17).

Color. Frons mat black, greyish pollinose; fronto-orbital plate and ocellar triangle mat black; upper shiny dark orbit touching ovt and ivt; upper shining dark orbit touching lunule and face silvery; clypeus mat black; gena greyish-black; scape and pedicel brown; first flagellomere orange brown; arista brown; palpus orange, with black setae apically; proboscis yellow; labelum yellow, with yellow setae; scutum and all pleurae uniformly brown, grey pollinose; haltere entirely light yellow; calypters light yellow, with margin and fringe brown; wing clear, yellow at base; legs dark brown; pulvilli yellow; abdomen entirely brown.

Head. Frons slightly visible above eye margin in lateral profile; 2 reclinate ors and 2 reclinate inwards ori, similar in size; interfrontal hairs absent; orbital setulae erect in one row; facial keel undifferentiated; eye height/parafacialia+gena: 9; ocellar triangle short, ending well before second ors; lunule high, 25% of frons length; clypeus rounded; epistoma height 0.06 mm; first flagellomere rounded and finely pubescent; arista long, slightly

longer than vertical height of eye, finely pubescent; vibrissa long and strong, measuring half of arisal length.

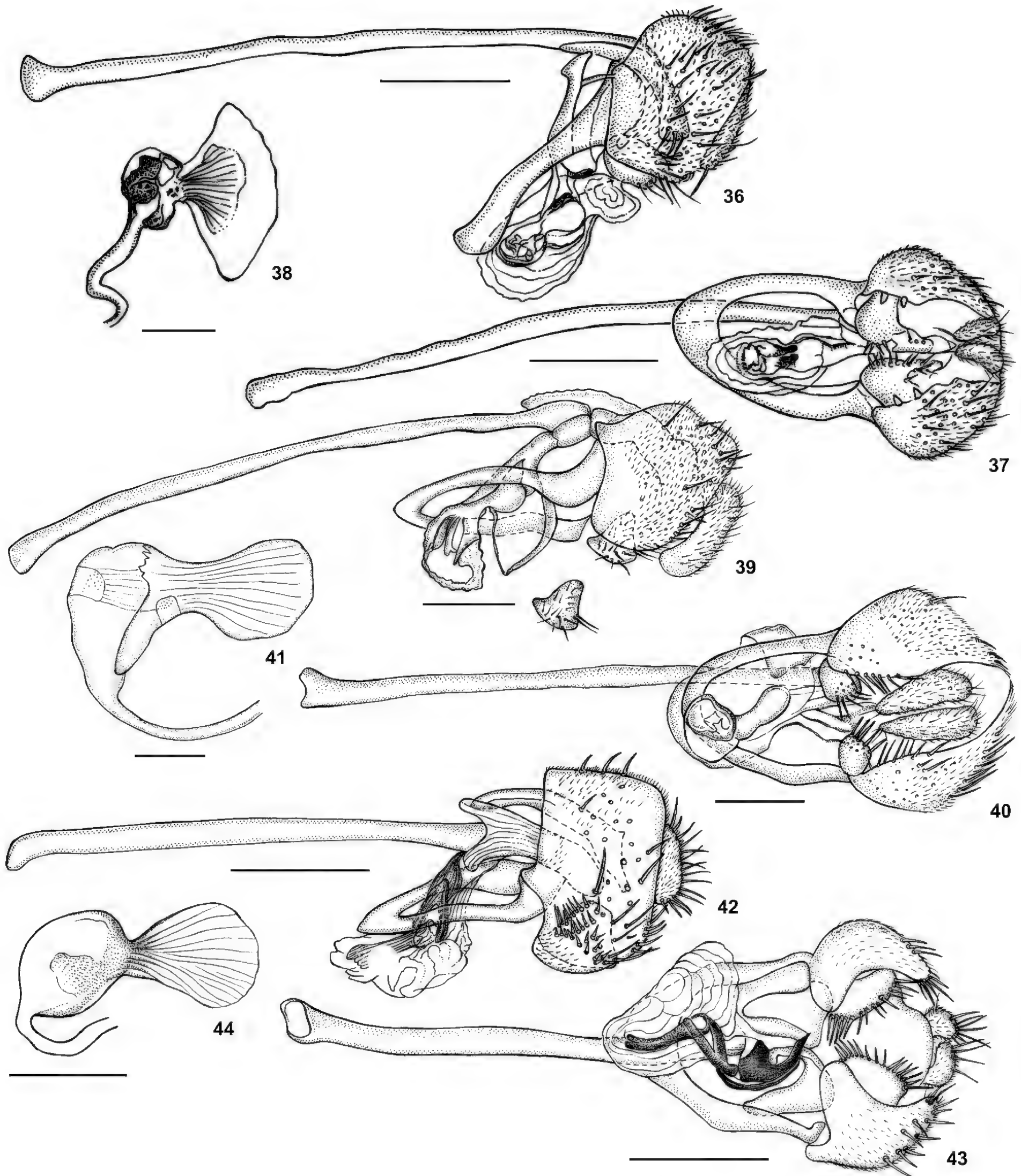
Thorax. Acr in six irregular rows; prsc absent; 1+3 dc, increasing in size from prescutellar; 2 npl, anterior one shorter than posterior. Wings. Wing tip nearer to R_{4+5} than M; R_{4+5} and M erect; C sections 2–4 in proportions: 0.71:0.14:0.14; ultimate section of CuA_1 1.37 length of basal section; r-m distal midpoint of dm. Legs. Fore tibia without pd; mid tibia with 1 pd on middle third.

Terminalia. Epandrium rounded with long setae (Fig. 66); cercus short, about 1/3 height of epandrium and with long setae, 1 distinct at apex; postgonite with four setae on apex; surstylus triangular with about 45 setae; hypandrium U-shaped; phallapodeme about twice length of hypandrium; mesophallus simple; distiphallus elongated (Fig. 67); ejaculatory apodeme broad, at its broader part about 5.8 times wider than constricted area at base (Fig. 68). Oviscape (Fig. 69). Spermathecae (Fig. 70).

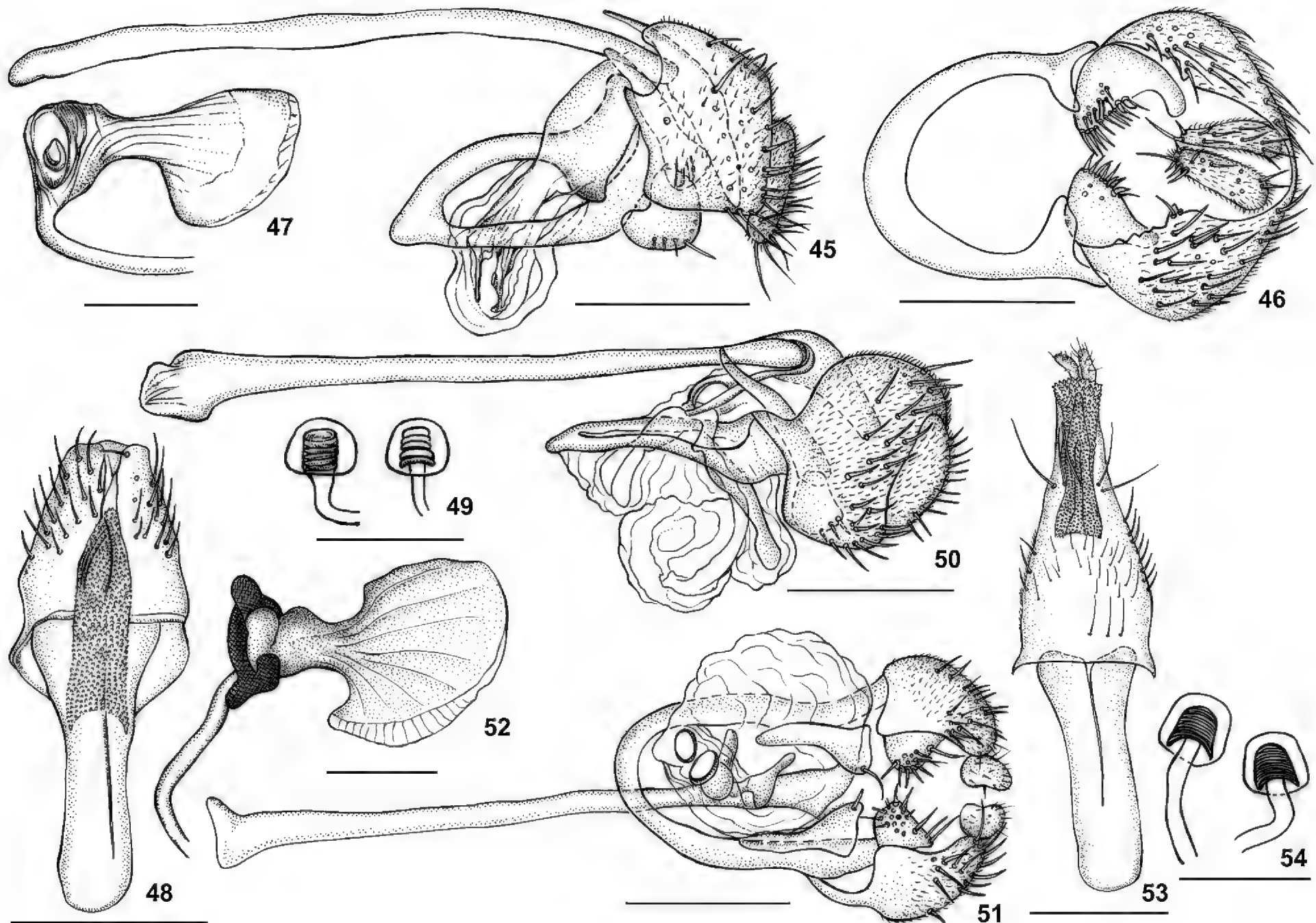
Distribution. Rondônia and Mato Grosso do Sul (Brazil).

Etymology. The specific epithet refers to the great number of setae on surstylus.

Remarks. This new species closely resembles *P. simpla* sp. nov. in wing length and general color of the body, but differs in having the frons mat black, greyish pollinose, and the presence of four setae on apex of postgonite, surstylus triangular with about 45 setae, phallapodeme about twice the length of hypandrium, distiphallus elongated, and ejaculatory apodeme broad with straight constriction.



Figures 36–44. (36–38) *Phytobia amazonica* sp. nov.: (36) phallus, lateral view; (37) phallus, ventral view; (38) ejaculatory apodeme; (39–41) *P. cacauplandia* sp. nov.: (39) phallus, lateral view; (40) phallus, ventral view; (41) ejaculatory apodeme; (42–44) *P. communis* sp. nov.: (42) phallus, lateral view; (43) phallus, ventral view; (44) ejaculatory apodeme. Scale bars: 36, 37, 39, 40, 43, 44 = 0.2 mm, 38, 41, 44 = 0.1 mm.



Figures 45–54. (45–49) *Phytobia delicata* sp. nov.: (45) phallus, lateral view; (46) phallus, ventral view; (47) ejaculatory apodeme; (48) oviscape; (49) spermathecae; (50–54) *P. flavifrontalis* sp. nov.: (50) phallus, lateral view; (51) phallus, ventral view; (52) ejaculatory apodeme; (53) oviscape; (54) spermathecae. Scale bars: 45, 46, 48, 50, 51, 53 = 0.2 mm, 47, 49, 52, 54 = 0.1 mm.

Phytobia niheii sp. nov.

<http://zoobank.org/BA74B462-94FA-4038-AA47-5AB30CDA5B3>
Figs 3, 18, 19, 33, 71–75

Type material. Holotype ♂: BRASIL: RO [Rondônia]: Campo Novo. Fazenda Amorim 10°40'6"S, 63°29'0"W – 248m. Malaise trap, 03–15.xii.2011. Amorim, Ament & Riccardi cols. [MZUSP]. Paratypes: same data as holotype, 3 ♂ [MZUSP]; 4 ♂ [MNRJ]; BRASIL: MS [Mato Grosso do Sul]: Aquidauana. Malaise 7. 20°26'03.7"S, 055°39'20.8"W. 22.viii–11.ix.2012. Lamas, Nihei & Eq. cols., 1 ♀ [MZUSP] (Fig. 3).

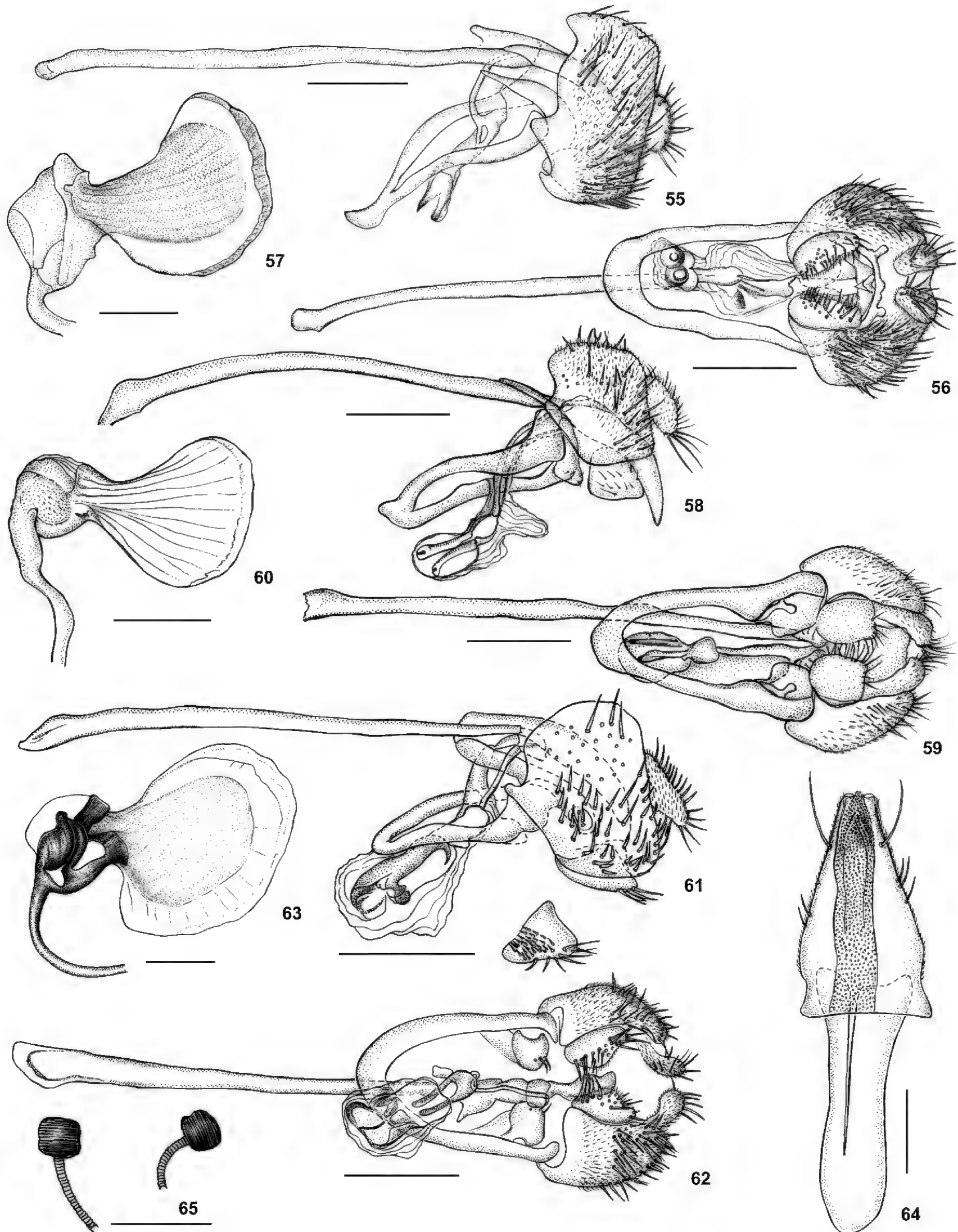
Description. Male. Body length 2.1 mm; wing length 1.7 mm (Fig. 18).

Female. Body length 2.4 mm; wing length: 1.75 mm (Fig. 19).

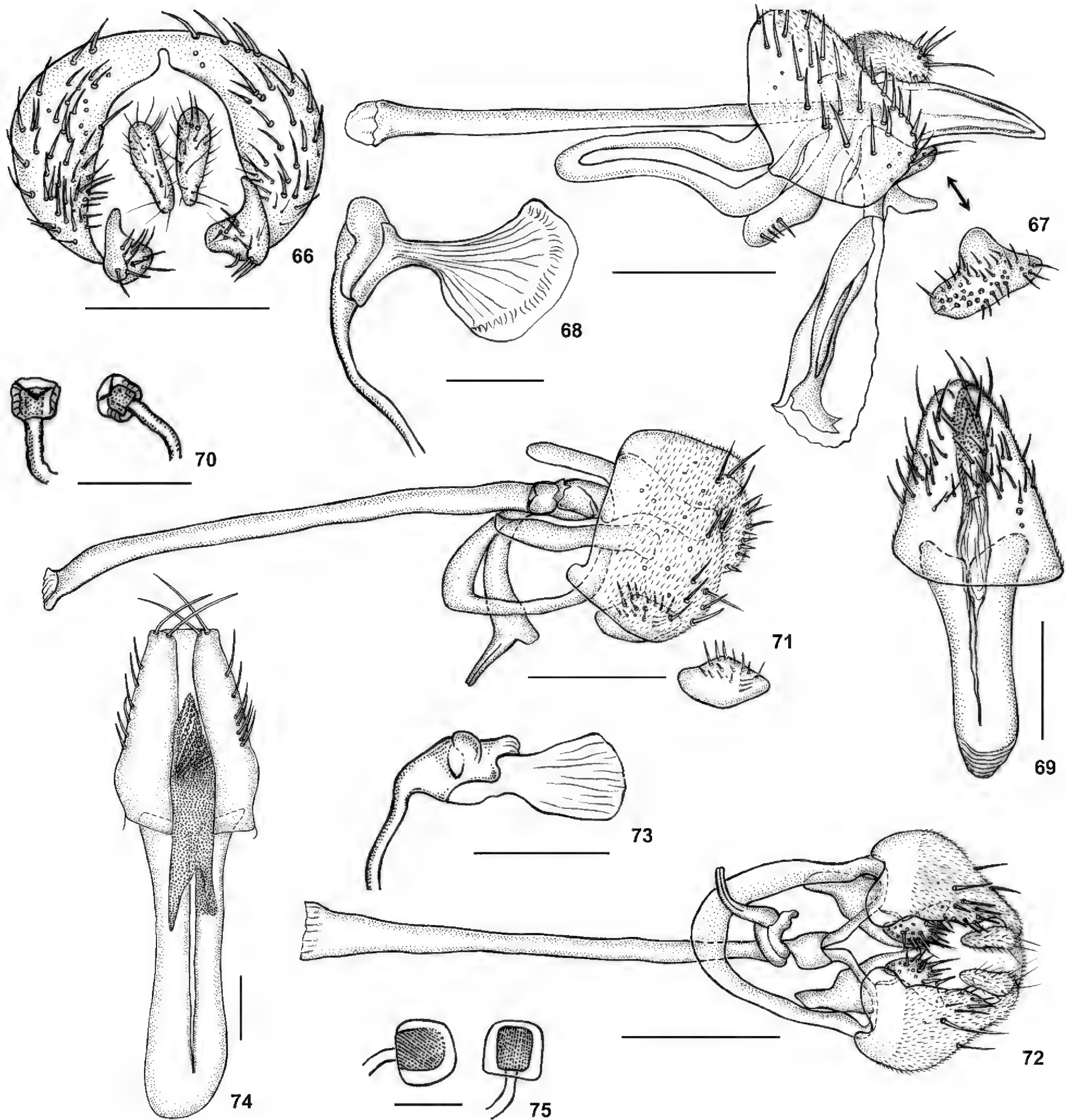
Color. Frons, fronto-orbital plate and ocellar triangle mat black; upper dark orbit touching ovt and ivt; lunule silvery; face

brown; clypeus black subshining; gena dark brown; scape and pedicel brown; first flagellomere brown, yellow apically; arista brown; palpus yellow; proboscis yellow; labellum yellow, with yellow setae; scutum brown with grey pollinose, light yellow before scutellum (Fig. 33); scutellum light yellow, brown laterally at basal two-thirds; postpronotum light yellow, with brown spot centrally; notopleuron light yellow; anepimeron dark brown, with upper and posterolateral margins yellow; anepisternum, katapimeron, katapisternum and meron dark brown; haltere entirely yellow; calypters light yellow, with margin and fringe black; wing clear, yellow at base; legs dark brown with fore knees yellow; pulvilli yellow; abdomen yellow, with dark brown spot centrally in all tergites, tergites 3–6 with dark brown spot on each side; terminalia dark brown.

Head. Frons slightly visible above the eye margin in lateral profile; 2 reclinate ors and 2 inclinate inwards ori, similar in size; orbital setulae erect, in one row; eye bare; facial keel undifferentiated; eye height/parafacialia+gena: 8; ocellar triangle



Figures 55–65. (55–57) *Phytobia kallima* (Frost): (55) phallus, lateral view; (56) phallus, ventral view; (57) ejaculatory apodeme; (58–60) *P. lamasi* sp. nov.: (58) phallus, lateral view; (59) phallus, ventral view; (60) ejaculatory apodeme; (61–65) *P. megapodema* sp. nov.: (61) phallus, lateral view; (62) phallus, ventral view; (63) ejaculatory apodeme; (64) oviscape; (65) spermathecae. Scale bars: 55, 56, 58, 59, 61, 62, 64 = 0.2 mm, 57, 60, 63, 65 = 0.1 mm.



Figures 66–75. (66–70 *Phytobia multisetosus* sp. nov.: (66) epandrium; (67) phallus, lateral view; (68) ejaculatory apodeme; (69) oviscap; (70) spermathecae; (71–75) *P. niheii* sp. nov.: (71) phallus, lateral view; (72) phallus, ventral view; (73) ejaculatory apodeme; (74) oviscap; (75) spermathecae. Scale bars: 66, 67, 69, 71, 72, 74 = 0.2 mm, 68, 70, 73, 75 = 0.1 mm.

short, ending before the second ors; lunule slightly high, 16,6% of frons length; clypeus obtuse; epistoma height 0.05 mm; first flagellomere rounded and finely pubescent; arista long, more than 2/3 of the vertical height of eye, finely pubescent; vibrissa

short and strong, measuring 1/3 of the arista length.

Thorax. Acr in six irregular rows; prsc absent; 1+3 dc, increasing in length from presutural; 2 npl, similar in size. Wings. Wing tip between R_{4+5} and M; R_{4+5} and M erect; C sections 2–4

in proportion: 0.58: 0.25: 0.16; ultimate section of CuA₁ 1.14 length of basal section; r-m distal to midpoint of dm. Legs. Fore tibia without pd; mid tibia with 1 pd on middle third.

Terminalia. Epandrium triangular with long setae; cercus short, about 1/3 height of epandrium and with setae; surstylus short, with about 19 setae; hypandrium U-shaped and short; phallapodeme about three times length of hypandrium; basiphallus with two arms; distiphallus straight (Figs 71, 72); ejaculatory apodeme small, at its broader part about 2.1 times wider than constricted area at base (Fig. 73). Oviscape (Fig. 74). Spermathecae (Fig. 75).

Distribution. Rondônia and Mato Grosso do Sul (Brazil).

Etymology. The specific epithet is in honor of Dr. Silvio Nihei (Universidade de São Paulo) in recognition of his great contribution to our knowledge of the Neotropical Diptera.

Remarks. This new species is morphologically similar to *P. cacaullandia* sp. nov., but can be distinguished by the clear wing, only one median seta on mid tibiae, and male terminalia with a conspicuously triangular epandrium, surstylus short, with about 19 setae, phallapodeme long, about three times the length of hypandrium, basiphallus with two arms, distiphallus straight, and ejaculatory apodeme small.

Phytobia planipalpis sp. nov.

<http://zoobank.org/86DE8F3B-08AB-47C9-9A6B-DD53933C1E50>
Figs 3, 20, 21, 76–80

Type material. Holotype ♂: BRASIL, MS [Mato Grosso do Sul]: Corguinho, Taboco, Reserva Quinta do Sol. 19°46'45.4"S, 55°14'36.2"W. 12–29.viii.2011. Malaise 13. Lamas, Nihei & eq. cols. [MZUSP]. Paratypes: same data as holotype, 1 ♂ [MNRJ]; 1 ♀, 29.viii–12.ix.2012 [MZUSP] (Fig. 3).

Description. Male. Body length 2.1 mm; wing length 2.0 mm (Fig. 20).

Female. Body length 2.7 mm; wing length 2.2 mm (Fig. 21).

Color. Frons mat black; fronto-orbital plate shining black; upper dark orbit touching ov and ivt; ocellar triangle mat black; lunule grey; face black with grey pollinose; clypeus black subshining; gena dark brown; antenna and arista entirely brown; palpus brown; proboscis light brown; labellum light brown, with brown setae; scutum dark brown, weakly shining; scutellum dark brown; postpronotum, notopleuron, anepimeron, anepisternum, katepimeron, katepisternum and meron dark brown; haltere entirely yellow; calypters light yellow with margin and fringe black; wing clear, yellow at base; legs dark brown; pulvilli yellow; abdomen entirely shining dark brown.

Head. Frons slightly visible above eye margin in lateral profile; 2 reclinate ors and 2 reclinate inwards ori, similar in size; orbital setulae erect in one row; facial keel undifferentiated; eye height/parafacialia+gena: 0.5; ocellar triangle short, ending before second ors; lunule high, 20% of frons length; clypeus rounded; epistoma height 0.04 mm; first flagellomere rounded

and finely pubescent; arista long, more than 2/3 of vertical height of eye, finely pubescent; palpus flattened; vibrissa short and strong, measuring about 1/3 of arista length.

Thorax. Acr in eight irregular rows; prsc present; 1+3 dc, presutural and first postsutural with same size, smaller than second and third, this longer than anterior one; 2 npl, anterior one shorter than posterior one. Wings. Wing tip nearer to R₄₊₅ than to M; R₄₊₅ and M erect; C sections 2–4: 0.60:0.20:0.20; ultimate section of vein CuA₁ 1.1 the length of basal section; r-m distal to midpoint of dm. Legs. Fore tibia without pd; mid tibia with 3 pd on the middle third.

Terminalia. Epandrium large and rounded with long setae; cercus long, about 2/3 height of epandrium and with long setae; postgonite with two basal setae in lateral view; surstylus oblong with about 13–20 setae; hypandrium U-shaped; phallapodeme about 2.5 times the length of the hypandrium; mesophallus sclerotized; distiphallus tulip-shaped (Figs 76, 77); ejaculatory apodeme broad, more pointed on upper part, at its broader part about 4.8 times wider than the constricted area at base (Fig. 78). Oviscape (Fig. 79). Spermathecae (Fig. 80).

Distribution. Mato Grosso do Sul (Brazil).

Etymology. The specific epithet is derived from the Latin words *planus* (flat) and *palpis* (palpus), referring to the flattened palpus of the species.

Remarks. This new species is morphologically similar to *P. kallima* in the dark coloration of the body, but it can be distinguished by the hyaline wing, palpus flattened, postgonite with two setae, surstylus with about 13–20 setae, and a distinct tulip-shaped distiphallus.

Phytobia pyri sp. nov.

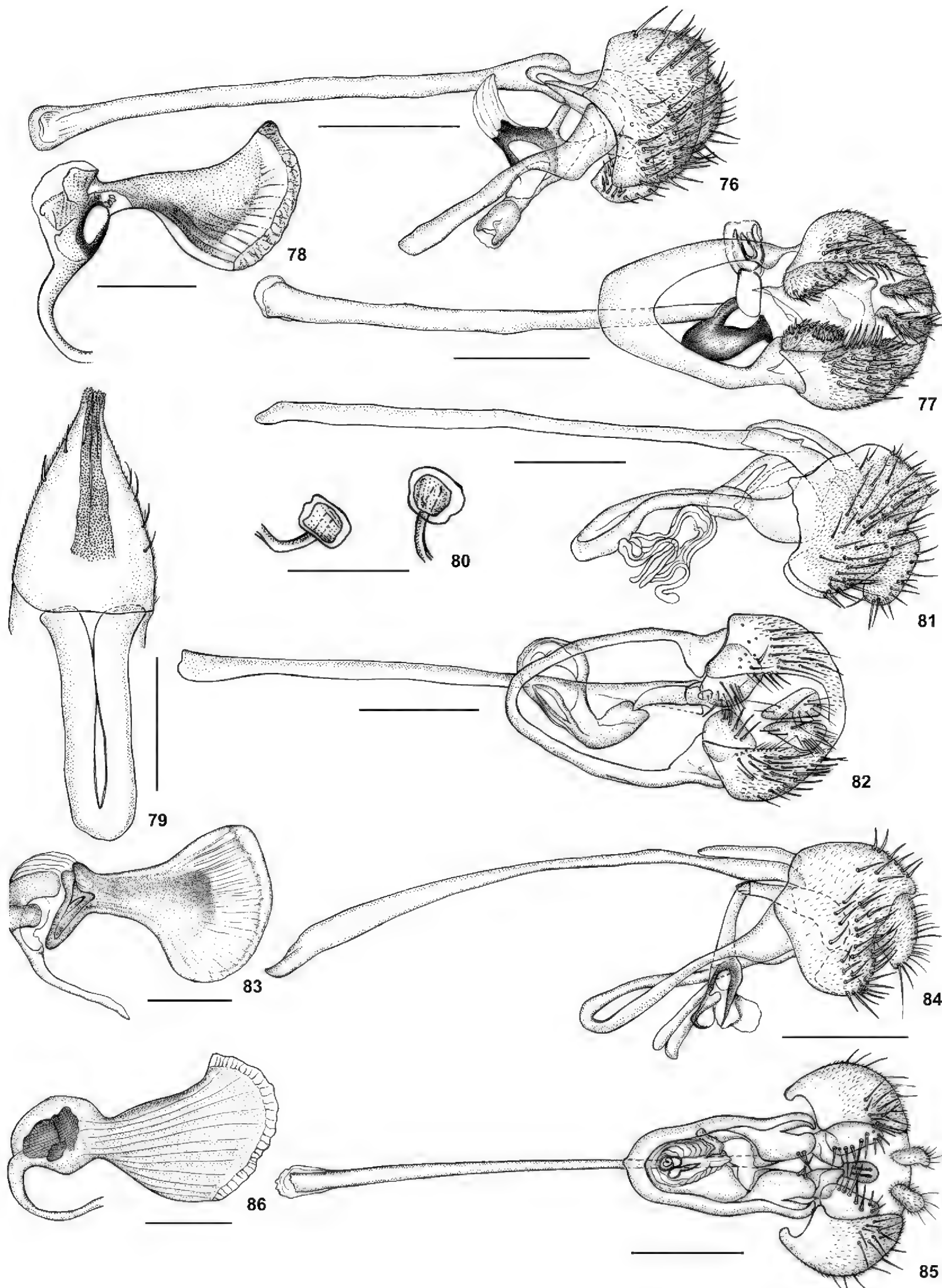
<http://zoobank.org/CB64A90A-6A8F-4DC6-90DC-C40B6DF77D35>
Figs 3, 22, 34, 81–83

Type material. Holotype ♂: BRASIL: RO [Rondônia]: Porto Velho. Rio Madeira – Ahe Jirau 9°24'14.60"S, 64°49'58.20"W. Malaise, 17–29.vii.2013. F.A. Fernandes & M.F. Sousa cols. [MZUSP]. Paratype: 1 ♂, Campo Novo, Fazenda Amorim. 10°40'6"S, 63°29'0"W – 248 m, Malaise trap 6 m, 03–15.xii. 2011, Amorim, Ament & Riccardi cols. [MNRJ] (Fig. 3).

Description. Male. Body length 3.0 mm; wing length 2.8 mm (Fig. 22).

Female. Unknown.

Color. Frons mat black; fronto-orbital plate and ocellar triangle weakly shining black; upper shining dark orbit touching ovt and ivt; lunule silvery; face greyish-black; clypeus black subshining; gena dark brown; antenna and arista entirely brown; palpus brown; proboscis brownish-yellow; labellum brownish-yellow, with light setae; scutum shining black, with yellow area before scutellum, black intra-alar area of scutum almost reaching scutellum and forming one short band divided by narrow yellow stripe (Fig. 34); scutellum light yellow; postpronotum light yellow, with small



Figures 76–86. (76–80) *Phytobia planipalpis* sp. nov.: (76) phallus, lateral view; (77) phallus, ventral view; (78) ejaculatory apodeme; (79) oviscape; (80) spermathecae. (81–86) *P. pyri* sp. nov.: (81) phallus, lateral view; (82) phallus, ventral view; (83) ejaculatory apodeme; *P. simpla* sp. nov.: (84) phallus, lateral view; (85) phallus, ventral view; (86) ejaculatory apodeme. Scale bars: 76, 77, 79, 81, 82, 84, 85 = 0.2 mm, 78, 80, 83, 86 = 0.1 mm.

central brownish spot; notopleuron and anepimeron light yellow; anepisternum light yellow, brown in lower part; katepimeron, katepisternum and meron brown; haltere entirely yellow; calypters light brown, yellow at base and with margin and fringe brown; wing infusate, darker on apical longitudinal third and on dm-cu crossvein; legs brown with fore knees brownish-yellow; pulvilli yellow; abdomen yellow on tergites 1+2 and tergite 3, tergite 4 with central black stripe, tergites 5, 6 and terminalia entirely black.

Head. Frons not visible above eye margin in lateral profile; 2 reclinate ors and 2 inclinate inwards ori, similar in size; orbital setulae erect in one row; facial keel undifferentiated; eye height/parafacialia+gena: 0.9; ocellar triangle short, ending before second ors; lunule high, 11% of frons length; clypeus rounded; epistoma height 0.03 mm; first flagellomere rounded and finely pubescent; arista long, more than 2/3 of vertical height of eye, short pubescent; vibrissa short and strong, measuring about 1/3 of arista length.

Thorax. Acr in seven irregular rows; prsc absent; 1+3 dc, increasing in size from presutural; 2 npl, similar in size. Wings. Wing tip between R_{4+5} and M; R_{4+5} and M slightly recurved; C sections 2–4: 0.69:0.15:0.15; ultimate section of CuA_1 0.58 length of basal section; r-m distal to midpoint of dm, close to limit of apical third. Legs. Fore tibia without pd; mid tibia with 2 pd on middle third.

Terminalia. Epandrium rounded setulose with long setae; cercus long, about 2/3 height of epandrium setulose and with long setae; surstylus rounded, with 6–11 setae; hypandrium U-shaped; phallapodeme about 2.5 length of hypandrium; basiphallus bifid; mesophallus rounded; distiphallus membranous, pear-shaped in dorsal view (Figs 81, 82); ejaculatory apodeme broad, at its broader part about 6.0 times wider than constricted area at base (Fig. 83).

Distribution. Rondônia (Brazil).

Etymology. The specific epithet refers to the pear-shaped distiphallus.

Remarks. *Phytobia pyri* sp. nov. is similar to *P. monsonensis* Sasakawa, 1992, from Peru, in the general coloration of the body, chaetotaxy and the length of the phallapodeme (2.5 mm) in relation to the length of the hypandrium. However, the new species can be differentiated by the length of the body and wing, lunule silver, mid tibiae with two posterodorsal setae on middle third, surstylus with 6–11 setae and the phallus shape with distiphallus membranous and pear-shaped in dorsal view.

Phytobia simpla sp. nov.

<http://zoobank.org/A35CDA90-D510-4850-BD69-0687F789D749>
 Figs 4, 23, 84–86

Type material. Holotype ♂: BRASIL, RO [Rondônia]: Campo Novo. Fazenda Amorim 10°40'6"S, 63°29'0"W – 248m. Malaise trap, 03–15.xii.2011. Amorim, Ament & Riccardi cols. [MZUSP]. Paratypes: same data as holotype, 2 ♂ [MZUSP]; 2 ♂ [MNRJ] (Fig. 4).

Description. Male. Body length 2.5 mm; wing length 2.0–2.3 mm (Fig. 23).

Female. Unknown.

Color. Frons and fronto-orbital plate mat black, with basal half reddish-brown; upper dark orbit touching ovt and ivt; ocellar triangle mat black, grey pollinose; lunule and face grey; clypeus mat black; gena brown; scape and pedicel orange; first flagellomere brown, orange apically; arista brown; palpus brown, with black setae apically; proboscis yellow; labellum yellow, with yellow setae; scutum brown, grey pollinose; scutellum greyish-black, postpronotum and notopleuron brown, grey pollinose; anepimeron brown; anepisternum greyish-brown; katepimeron, katepisternum and meron dark brown; haltere entirely yellow; calypters light yellow, with margin and fringe black; wing clear; legs brown; pulvilli yellow; abdomen entirely brown.

Head. Frons slightly visible above eye margin in lateral profile; 2 reclinate ors and 2 inclinate inwards ori, similar in size; orbital setulae erect in one row; facial keel undifferentiated; eye height/gena+parafacialia: 5; ocellar triangle short, ending before second ors; lunule high, about 20% of frons length; clypeus rounded; epistoma height 0.03 mm; first flagellomere rounded and finely pubescent; arista long, with same measure of vertical height of eye, minutely pubescent; vibrissa long and strong, measuring almost half of arista length.

Thorax. Acr in eight irregular rows; prsc present; 1+3 dc, increasing in length from prescutellar; 2 npl, anterior longer than posterior. Wings. Wing tip between R_{4+5} and M; R_{4+5} and M erect; C sections in proportion: 2–4: 0.64:0.17:0.17; ultimate section of CuA_1 0.5 length of basal section; r-m distal to midpoint of dm. Legs. Fore tibia without pd; mid tibia with 1 pd on middle third.

Terminalia. Epandrium rounded, wider than height, with long setae; cercus long, about 2/3 height of epandrium and with long setae and distinct seta at apex; surstylus rounded with about 10 setae; hypandrium U-shaped with small projection on apex; phallapodeme about twice length of hypandrium; mesophallus simple and thin; distiphallus sclerotized with two medium arms (Figs 84, 85); ejaculatory apodeme broad, at its broader part about 3.4 times wider than constricted area at base (Fig. 86).

Distribution. Rondônia (Brazil).

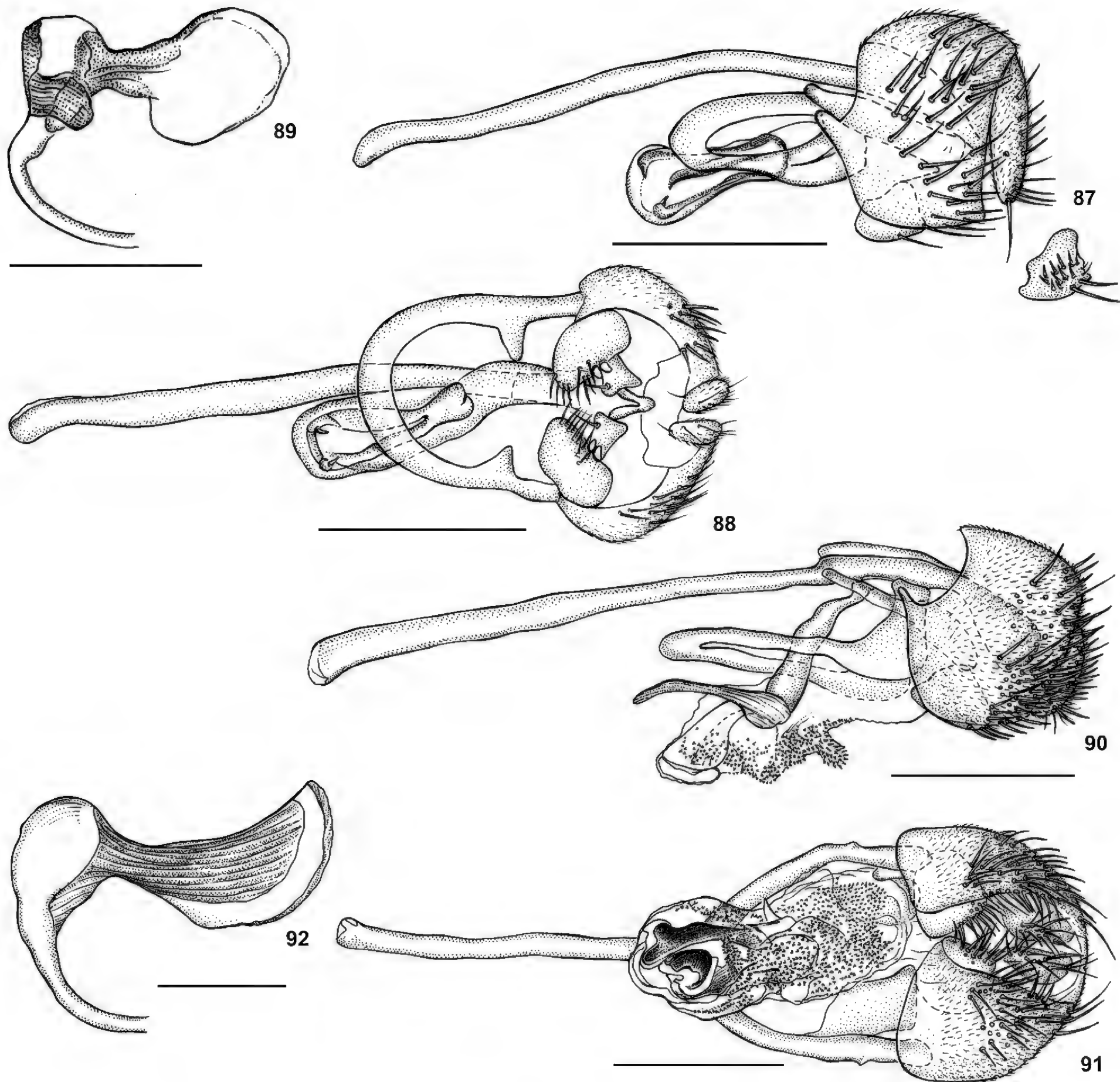
Etymology. The specific epithet refers to the simple shape of the phallus.

Remarks. *Phytobia simpla* sp. nov. is morphologically similar to *P. multisetosa* sp. nov. in the length of the wing and color of the scutum, brown grey pollinose. It can be distinguished by the frons mat black, with basal half brown close to lunule, surstylus rounded with about 10 setae and distiphallus sclerotized with two medium arms.

Phytobia spinifera sp. nov.

<http://zoobank.org/D63A0B19-13C7-4122-88BA-D767A20677FA>
 Figs 4, 24, 35, 87–89

Type material. Holotype ♂: BRASIL, MT [Mato Grosso]: Chapada dos Guimarães – Vale da Benção. 15°26'10"S,



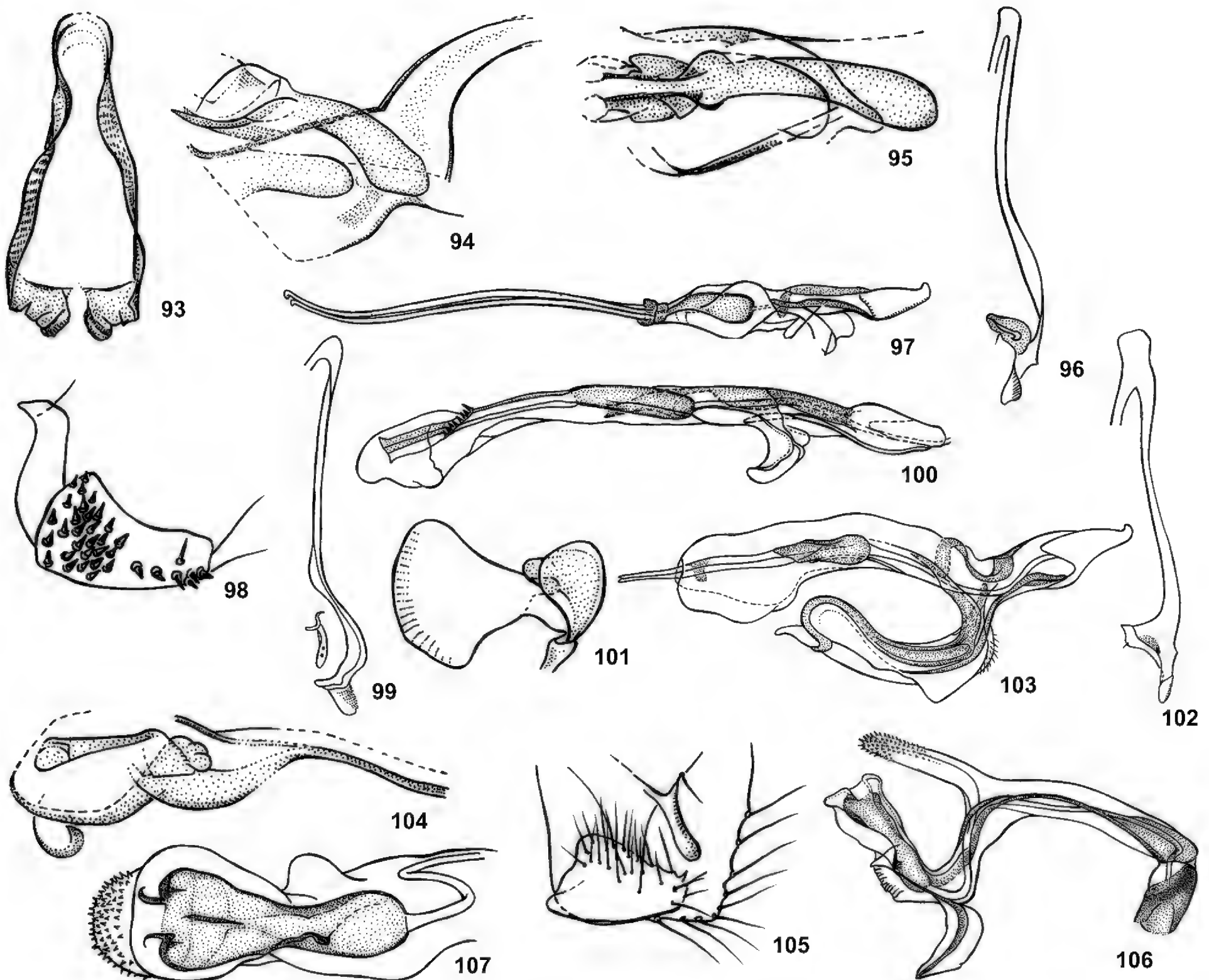
Figures 87–92. (87–89) *Phytobia spinifera* sp. nov.: (87) phallus, lateral view; (88) phallus, ventral view; (89) ejaculatory apodeme; (90–92) *P. spinosula* sp. nov.: (90) phallus, lateral view; (91) phallus, ventral view; (92) ejaculatory apodeme. Scale bars: 87, 88, 90, 91 = 0.2 mm, 89, 92 = 0.1 mm.

55°47'23"W. 11.vii.2012, varredura [sweeping net], Sousa, V.R. col. [MZUSP]. Paratypes: same data as holotype, 1 ♂ [MZUSP]; 1 ♂, BRASIL: MT [Mato Grosso], Chapada dos Guimarães (Cerrado) – Trilha da Pedra – final (mirante). 15°24'21.8"S, 055°50'07.5"W. Malaise 22. 18.iv-02.vii.2012. Lamas, Nihei & Eq. cols. [MNRJ]; 1 ♂, 17.i-09.iii.2012 [MNRJ] (Fig. 4).

Description. Male. Body length 1.8 mm; wing length 1.7 mm (Fig. 24).

Female. Unknown.

Color. Frons mat black; fronto-orbital plate weakly shining black; upper dark orbit touching ovt and ivt; ocellar triangle mat black; lunule silvery; face greyish-black; clypeus

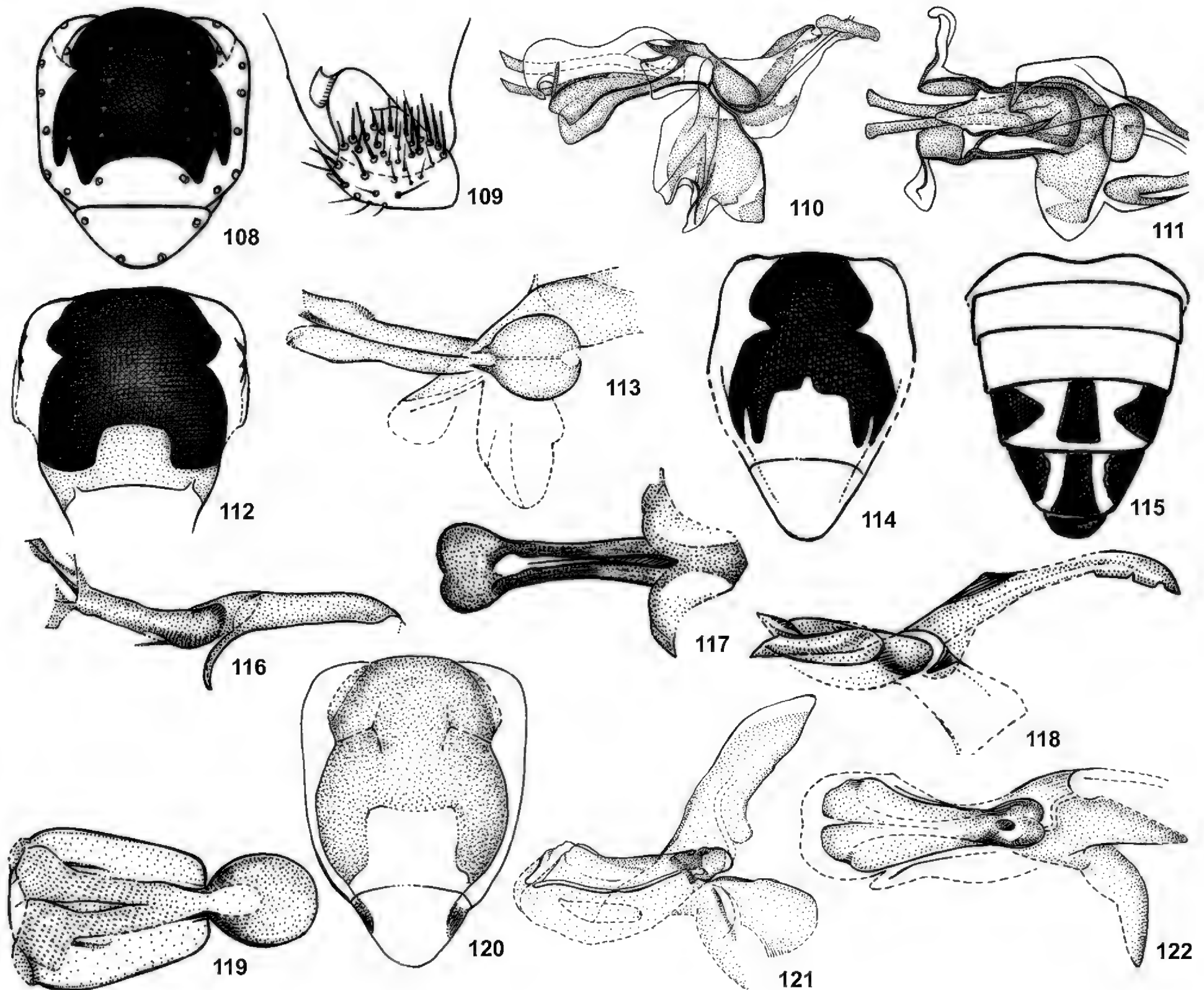


Figures 93–107. *Phytobia unica*: (93) hypandrium; (94) phallus, lateral view; (95) phallus, ventral view; *P. mentula*: (96) hypandrium; (97) phallus, lateral view; *P. guatemalensis*: (98) surstylus; (99) hypandrium; (100) phallus, ventral view; (101) ejaculatory apodeme; *P. pipinna*: (102) hypandrium; (103) phallus, lateral view; *P. peruensis*: (104) phallus, lateral view; *P. spinulosa*: (105) surstylus; (106) phallus, lateral view; (107) phallus, ventral view. Figs 93–95 modified from Spencer and Stegmaier Jr (1973), Figs 96, 97, 102, 103 modified from Sasakawa (1992c), Figs 98–100 modified from Sasakawa (2005), Fig. 104 modified from Spencer (1977), Figs 105–107 modified from Sasakawa (1992b).

black, slightly shiny; gena brown; antenna and arista entirely blackish-brown; palpus brown; proboscis light yellow; labelum light yellow, with yellow setae; scutum weakly shining black, strongly yellow laterally and before scutellum, black intra-alar area of scutum not reaching scutellum and forming two distinct bands divided by narrow yellow stripe (Fig. 35); scutellum strongly yellow; postpronotum strongly yellow, with central brownish spot; notopleuron and anepimeron strongly yellow; anepisternum strongly yellow, brown on basal half;

katepimeron yellow; katepisternum and meron brown; haltere entirely yellow; calypters whitish-yellow, with margin and fringe brown; wing clear; legs brown with fore knees brownish-yellow; pulvilli light yellow; abdomen yellow, T5 and T6 with median brown spot; terminalia entirely brown.

Head. Frons not visible above eye margin in lateral profile; 2 reclinate ors and 2 inclinate inwards ori, similar in size; orbital setulae slightly reclinate in one row; facial keel undifferentiated; eye margins little divergent towards vertex;



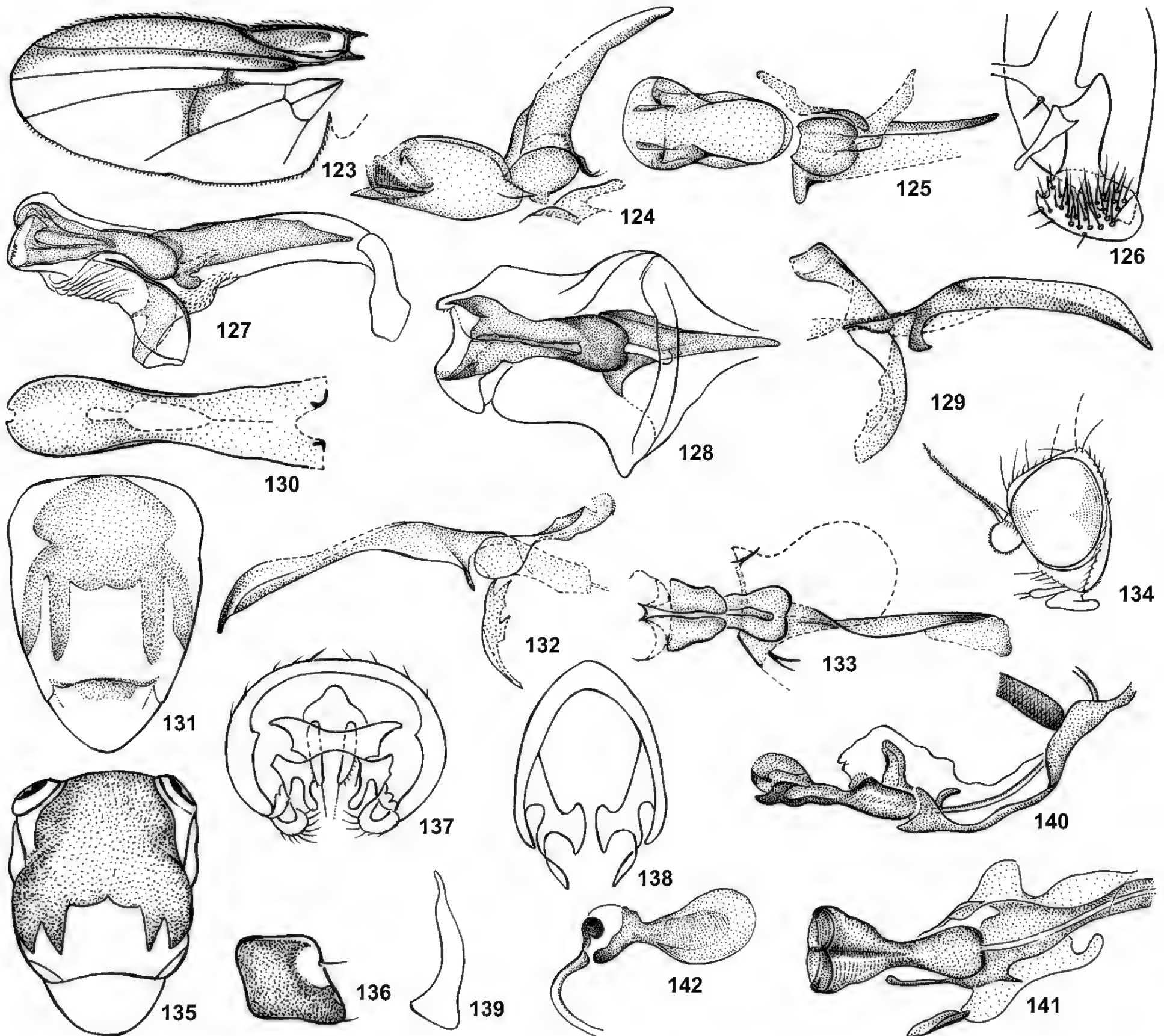
Figures 108–122. *Phytobia setitibialis*: (108) thorax; (109) surstylus; (110) phallus, lateral view; (111) phallus, ventral view; *P. matura*: (112) scutum; *P. xanthophora*: (113) phallus, lateral view; *P. ecuadorensis*: (114) scutum; (115) abdomen; (116) phallus, lateral view; (117) phallus, ventral view; *P. picta*: (118) phallus, lateral view; (119) phallus, ventral view; *P. lanei*: (120) scutum; (121) phallus, lateral view; (122) phallus, ventral view. (Figs 108–111 modified from Sasakawa 1992a; Figs 112, 113, 118, 119 modified from Spencer and Stegmaier Jr 1973; Figs 114–117 modified from Spencer 1977; Figs 120–122 modified from Spencer 1966).

eye height/gena+parafacialia: 5; ocellar triangle short, ending before second ors; lunule high, 17.6% of frons length; clypeus rounded; epistoma height 0.02 mm; first flagellomere rounded and finely pubescent; arista longer than eye height, finely pubescent; vibrissa short and thin, measuring less than 1/3 of arisal length.

Thorax. Acr in seven irregular rows; prsc absent; 1+3 dc, increasing in length from presutural; 2 npl, similar in size. Wings. Wing tip nearer to R_{4+5} than to M; R_{4+5} and M erect; C sections 2–4 in proportion: 0.58:0.25:0.16; ultimate section of

CuA₁ 0.9 length of basal section; r-m distal to midpoint of dm. Legs. Fore tibia without pd; mid tibia with 2 pd on middle third.

Terminalia. Epandrium rounded with long setae; cercus very long, with almost same size of height of epandrium and with long setae and distinct seta on apex in lateral view; postgonite with one basal seta in ventral view; surstylus rounded with about 8–13 setae and two strong spines; hypandrium U-shaped; phallapodeme about twice length of hypandrium; mesophallus tubular; distiphallus bulb-shaped with one apical spine on each side (Figs 87, 88); ejaculatory apodeme broad,



Figures 123–142. *Phytobia rabelloi*: (123) wing; (124) phallus, lateral view; (125) phallus, ventral view; *P. monsonensis*: (126) surstylus; (127) phallus, lateral view; (128) phallus, ventral view; *P. dorsocentralis*: (129) phallus, lateral view; (130) phallus, ventral view; *P. kuhlmanni*: (131) scutum; (132) phallus, lateral view; (133) phallus, ventral view; *P. resupitata*: (134) head; (135) scutum; (136) anepsternum; (137) epandrium; (138) hypandrium; (139) postgonite; (140) phallus, lateral view; (141) phallus, ventral view; (142) ejaculatory apodeme. (Figs 123–124, 131–133 modified from Spencer 1966; Figs 126–128 modified from Sasakawa 1992c; Figs 129, 130 modified from Spencer and Stegmaier Jr 1973; Figs 143–142 modified from Zlobin 2008).

at its broader part about 4.0 times wider than constricted area at base (Fig. 89).

Distribution. Mato Grosso (Brazil).

Etymology. The specific epithet refers to the presence of two spines on the distiphallus.

Remarks. This new species is close to *P. delicata* sp. nov.

in external characteristics and coloration of the body, but it can be distinguished by the male terminalia with a basal seta on postgonite, surstylus with about 11–13 setae and two strong spines, and distiphallus bulb-shaped with one apical spine on each side.

Phytobia spinosula sp. nov.

<http://zoobank.org/E79C960D-D776-4467-BAEB-2F2EB978012F>
Figs 4, 25, 90–92

Type material. Holotype ♂: BRASIL: MS [Mato Grosso do Sul]: Corumbá. BEP – Trans. Ciliar/Paratudal 19°34'20.09"S, 57°00'57.09"W. Malaise 2. 31.i-15.ii.2012. Lamas, Nihei & eq. cols. [MZUSP]. Paratypes: 2 ♂, Malaise 02, 01–16.i.2012 [MNRJ]; 1 ♂, 01–16.iii.2012, Malaise 03 [MZUSP] (Fig. 4).

Description. Male. Body length 2.75 mm; wing length 2.5 mm (Fig. 25).

Female. Unknown.

Color. Frons mat black; fronto-orbital plate shining black; upper dark orbit touching ovt and ivt; ocellar triangle mat black; lunule silvery; face dark brown; clypeus black subshining; gena dark brown; antenna and arista entirely brown; palpus brown; proboscis brown; labellum brown, with brown setae; scutum and scutellum shining dark brown; postpronotum, notopleuron, anepimeron, anepisternum, katepimeron, katepisternum, meron and haltere entirely yellow; calypters light yellow with margin and fringe black; wing clear, yellow at base; legs dark brown; pulvilli yellow; abdomen entirely dark brown.

Head. Frons not visible above eye margin in lateral profile; 2 reclinate ors and 2 inclinate inwards ori, similar in size; orbital setulae slightly reclinate in one row; eye bare; facial keel undifferentiated; eye height/gena+parafacialia: 0.7; ocellar triangle short, ending before ors; lunule high and large, about 21% of frons length; clypeus rounded; epistoma height 0.05 mm; first flagellomere rounded and finely pubescent; arista as long as vertical height of eye, finely pubescent; vibrissa short and strong, about 1/3 of arisal length.

Thorax. Acr in nine irregular rows; prsc present; 0+2 dc, first smaller than last one; 2 npl, similar in size. Wings. Wing tip between R_{4+5} and M; R_{4+5} and M erect; C sections 2–4 in proportion: 0.58:0.23:0.17; ultimate section of vein CuA_1 0.75 length of basal section; r-m past middle point of dm. Legs. Fore tibia without pd; mid tibia with 2 pd on middle third.

Terminalia. Epandrium large and rounded with long setae; cercus short, about 1/3 height of epandrium and with long setae; surstylus rounded with about 12–16 setae; hypandrium U-shaped; phallapodeme about twice length of hypandrium; basiphallus simple, membranous; mesophallus tubular; distiphallus bifid with very spinose surrounding membrane (Figs 90, 91); ejaculatory apodeme sickle-shaped, at its broader part about 2.5 times wider than constricted area at base (Fig. 92).

Distribution. Mato Grosso do Sul (Brazil).

Etymology. The specific epithet refers to the spinous membrane around the phallus.

Remarks. This species is morphologically close to *P. unica* Spencer (in Spencer and Stegmaier Jr 1973), known from Jamaica, due to the presence of only 2 dc and general coloration of the head, but it can be distinguished by the presence of the two posterodorsal setae on mid tibiae, the prescutellar present, and

the male terminalia with distiphallus bifid with a surrounding membrane bearing many spines.

Key to Neotropical species of *Phytobia* Lioy

- 1 Presutural dorsocentral seta absent.....2
- Presutural dorsocentral seta present7
- 2 Two postsutural dorsocentral setae.....3
- Three postsutural dorsocentral setae.....4
- 3 Mid tibia with one posterodorsal seta on middle third [surstylus entirely separated by suture from epandrium, thickly covered with short setae; cercus long; hypandrium unusually elongate, constricted towards apex (Fig. 93); phallus as in Figs 94, 95; base of ejaculatory apodeme bowl-shaped] [Costa Rica, Jamaica] *P. unica* Spencer, 1973
- Mid tibia with two posterodorsal setae on middle third [surstylus rounded with about 12–16 setae; hypandrium U-shaped; basiphallus simple, membranous; mesophallus tubular; distiphallus bifid with very spiny surrounding membrane (Figs 90, 91); ejaculatory apodeme sickle-shaped, with its broader part about 2.5 times wider than constricted area at base (Fig. 92)] [Brazil] *P. spinosula* sp. nov.
- 4 Mid tibia with one posterodorsal seta on middle third...5
- Mid tibia with two posterodorsal setae on middle third.6
5. Frons black [epandrium densely setulose; surstylus with about 37 spines, including 6–7 minute ones; cercus with dense setae; hypandrium about 4/5 length of phallapodeme (Fig. 96); phallus about 1.2 times as long as phallapodeme, distiphallus as two long tubules, basiphallus short but rather well-developed, ventral process membranous (Fig. 97)] [Peru]*P. mentula* Sasakawa, 1992
- Frons brownish-black on upper part and orange-brown lowerly [cercus $\frac{3}{4}$ as high as epandrium; surstylus separated from epandrium, broadened posteriorly, bearing 35–37 spines (Fig. 98); hypandrium $\frac{3}{4}$ length of phallapodeme, without basal apodeme, spinulose on distal apex (Fig. 99); phallus very long, only a little shorter than phallapodeme, basiphallus narrow, distiphallus membranous distally, with distinct basal tube and pair of spinose, narrow sclerites on lateral side before end (Fig. 100); ejaculatory apodeme (Fig. 101)] [Guatemala]*P. guatemalensis* Sasakawa, 2005
- 6 Scape and pedicel yellow; frons with dorsal half brownish-black and ventral half testaceous; mid and hind tibiae entirely light brown [surstylus with 23–26 spines; hypandrium slightly shorter than phallapodeme (Fig. 102); phallus with distinct ventral process and tubules of distiphallus short (Fig. 103)] [Peru] *P. pipinna* Sasakawa, 1992
- Scape and pedicel dark brown; frons egg yellow in lower half and yellow pollinose on upper half; all legs dark brown, fore knees yellow [postgonite with basal seta in ventral view; surstylus rounded with about 11–18 setae; hypandrium U-shaped; distiphallus as in Figs 50, 51; ejac-

- ulatory apodeme broad, at its broader part about 4.1 times wider than constricted area at base (Fig. 52)) [Brazil]
..... *P. flavifrontalis* sp. nov.
- 7 Abdomen entirely black 8
- Abdomen mostly yellow 12
- 8 Wing spotted [surstylus oblong and large with about 23–32 setae; hypandrium U-shaped; distiphallus as in Figs 55, 56; ejaculatory apodeme broad, at its broader part about 3.3 times wider than constricted area at base (Fig. 57)] [Brazil, Panama] *P. kallima* (Frost, 1936)
- Wing not spotted 9
- 9 Mid tibia with three posterodorsal setae on middle third [postgonite with two basal setae in lateral view; surstylus oblong with about 13–20 setae; hypandrium U-shaped; mesophallus sclerotized; distiphallus tulip-shaped (Figs 76, 77); ejaculatory apodeme broad, more pointed on upper part, at its broader part about 4.8 times wider than constricted area at base (Fig. 78)] [Brazil] *P. planipalpis* sp. nov.
- Mid tibia with one or two posterodorsal setae on middle third 10
- 10 Medium sized species, wing length 3.4 mm; scutum deep black, moderately shining [surstylus rounded, only with hairs, without setae on inner margin; hypandrium with broad arms; phallus asymmetrical (Fig. 104)] [Chile, Peru] *P. peruensis* Spencer, 1977
- Smaller species, wing length 2.1–2.3 mm; scutum brown, grey pollinose 11
- 11 Frons mat black, greyish pollinose [postgonite with four setae on apex; surstylus triangular with about 45 setae (Fig. 66); hypandrium U-shaped; distiphallus elongated (Fig. 67); ejaculatory apodeme broad, at its broader part about 5.8 times wider than constricted area at base (Fig. 68)] [Brazil] *P. multisetosa* sp. nov.
- Frons mat black, with basal half reddish-brown or reddish-brown close to lunule [surstylus rounded with about 10 setae; hypandrium U-shaped with small projection on apex; distiphallus sclerotized with two medium arms (Figs 84, 85); ejaculatory apodeme broad, at its broader part about 3.4 times wider than constricted area at base (Fig. 86)] [Brazil] *P. simpla* sp. nov.
- 12 Legs entirely brown or black 13
- Legs with at least the anterior knee yellow 18
- 13 First flagellomere testaceous-orange [epandrium slightly narrowed ventrally, with surstylus curved and bearing many setae and spinous process posteriorly (Fig. 105); hypandrium V-shaped; phallapodeme extremely long, with anterior end extending to anterior margin of tergite 3; phallus about 1/3 of phallapodeme, basi and distiphallus simple in shape, the former with membranous projection densely spinulose on tip (Figs 106, 107)] [Ecuador]
..... *P. spinulosa* Sasakawa, 1992
- First flagellomere black 14
- 14 Dorsocentrals 1+4 [scutum brownish-black, whitish-grey dusted, subshining, broadly yellow posteriorly adjoining scutellum and laterally (Fig. 108); epandrium broadened ventrally but narrowed below joint of hypandrium; surstylus ovoid ventrally, densely setulose and with a papilla dorsally (Fig. 109); hypandrium with arms oval in form, narrow and almost as wide as postgonite; phallus 2/3 length of phallapodeme, basiphallus accompanied by large ventral process, distiphallus with ventral processes extended laterally at end and pair of long tubes dorsally (Figs 110, 111) [Colombia] *P. setitibialis* Sasakawa, 1992
- Dorsocentrals 1+3 15
- 15 Scutum with dark area conspicuously mat grey, dark area not divided into separate bands laterally (Fig. 112) [abdomen with brownish-yellow ground color, all tergites except first shining black centrally and broadly black at sides] [Dominica] *P. matura* Spencer, 1973
- Scutum moderately or largely shining black 16
- 16 Abdomen yellow, with last segment black [phallus with distinctly elongated distal tubules (Fig. 113)]
..... *P. xanthophora* (Schiner, 1868)
- Abdomen yellow, with tergites 5 and 6 with lateral and central bands 17
- 17 Phallus as in Figs 116, 117 [scutum (Fig. 114) abdomen with anterior tergites completely yellow, tergites 5 and 6 with black markings (Fig. 115)] [Ecuador]
..... *P. ecuadorensis* Spencer, 1977
- Phallus as in Figs 118, 119 [Costa Rica, Cuba, Mexico, Panama, Puerto Rico] *P. picta* (Coquillett)
- 18 Wing distinctly brown along anterior margin 19
- Wing not brown along anterior margin 22
- 19 Wing length 5.1 mm in male; first flagellomere orange [lower part of frons orange; scutum mat black, with central yellow rectangular area in front at level of 2nd dorsocentral, broadening behind adjoining scutellum (Fig. 120); phallus (Figs 121, 122)] [Brazil]
..... *P. lanei* Spencer, 1966
- Wing length at least 4.0 mm in male; first flagellomere brown or black 20
- 20 Dorsocentrals postsutural 4 [wing spotted (Fig. 123); phallus as in Figs 124, 125)] [Brazil, Costa Rica (doubtful record), Ecuador] *P. rabelloi* Spencer, 1966
- Dorsocentrals postsutural 3 21
- 21 Lunule yellow, whitish pruinose; one posterodorsal seta on middle third [surstylus separated from epandrium, bearing 20–22 setae (Fig. 126); phallus weakly sclerotized, as long as hypandrium, distiphallus bifid distally (Figs 127, 128)] [Peru] *P. monsonensis* Sasakawa, 1992
- Lunule silvery; two posterodorsal setae on middle third [surstylus rounded, with 6–11 setae; hypandrium U-shaped; basiphallus bifid; mesophallus rounded; distiphallus membranous, pear-shaped in dorsal view (Figs

- 81, 82); ejaculatory apodeme broad, at its broader part about 6.0 times wider than constricted area at base (Fig. 83)] [Brazil] *P. pyri* sp. nov.
- 22 Dorsocentrals presutural 2 [phallus as in Figs 129, 130] [Costa Rica, Panama] *P. dorsocentralis* (Frost)
- Dorsocentral presutural 1 23
- 23 Frons with lower half brown or reddish-brown or reddish-brown above lunule 24
- Frons entirely mat black 26
- 24 Wing length 4.2 mm [scutum mat grey in front, with central rectangular area adjoining scutellum yellow, black of intra-alar area not reaching scutellum and forming two distinct lateral bands divided by narrow yellow stripe (Fig. 131); phallus (Figs 132, 133)] [Brazil] *P. kuhlmanni* Spencer, 1966
- Wing length 2.25–2.3 mm 25
- 25 Scape and pedicel almost entirely orange brown [surstylus rounded, triangular on apex, with about 32 setae; hypandrium U-shaped and short; distiphallus sclerotized with two arms (Figs 42, 43); ejaculatory apodeme small, at its broader part about 4.0 times wider than constricted area at base (Fig. 44)] [Brazil] *P. communis* sp. nov.
- Scape and pedicel brown; first flagellomere brown, light brown apically [postgonite with three basal setae in ventral view; surstylus triangular with about 38 setae; hypandrium U-shaped; distiphallus very complex, as in Figs 61, 62; ejaculatory apodeme very broad, at its broader part about 4.0 times wider than constricted area at base (Fig. 63)] [Brazil] *P. megapodema* sp. nov.
- 26 Wing slightly infusate with brown area above Sc and in cup cell [surstylus short, rounded with about 11–13 long and strong setae; hypandrium U-shaped; basiphallus rounded; distiphallus short (Figs 39, 40); ejaculatory apodeme straight, at its broader part about 1.9 times wider than constricted area at base (Fig. 41)] [Brazil] *P. cacaullandia* sp. nov.
- Wing clear 27
- 27 Mid tibia with one posterodorsal median seta [surstylus short, with about 19 setae; hypandrium U-shaped and short; phallapodeme about three times length of hypandrium; basiphallus with two arms (Figs 71, 72); distiphallus straight; ejaculatory apodeme small, at its broader part about 2.1 times wider than constricted area at base (Fig. 73)] [Brazil] *P. niheii* sp. nov.
- Mid tibia with two or three posterodorsal median setae ... 28
- 28 Wing length 2.8 mm; lunule testaceous, pruinose [head (Fig. 134); scutum largely black, distinctly mat greyish, but weakly shining viewed from behind, broadly yellow centrally from second dc to margin of scutellum (Fig. 135); anepisternum largely black, with small, semicircular yellow spot along hind margin (Fig. 136); epandrium blackish and surstylus bilobate (Fig. 137); hypandrium V-shaped, about half of phallapodeme in length (Fig. 138); postgonite moderately large, long, gradually tapering dorsally (Fig. 139); distiphallus tubules entirely fused with each other, with two distinctive patches of black pigmentation at end (Figs 140, 141); ejaculatory apodeme pump with strongly sclerotized plate (Fig. 142)] [Peru] *P. resupitata* Zlobin, 2008
- Wing length 1.7 to 2.2 mm; lunule silvery 29
- 29 Mid tibia with three posterodorsal median setae [postgonite with three basal setae in ventral view; surstylus with 10–11 setae; hypandrium U-shaped; distiphallus with median constriction (Figs 36, 37); ejaculatory apodeme very broad, at its broader part about 4.5 times wider than constricted area at base (Fig. 38)] [Brazil] *P. amazonica* sp. nov.
- Mid tibia with only two posterodorsal median setae 30
- 30 Abdomen yellow, with brown stripes on tergites 3–5, tergite 6 almost entirely brown, terminalia brown [postgonite with 3–4 short setae on apex; surstylus rounded, with about 12 setae; hypandrium U-shaped; distiphallus rounded with two sclerotized areas centrally (Figs 58, 59); ejaculatory apodeme broad, at its broader part about 3.3 times wider than constricted area at base (Fig. 60)] [Brazil] *P. lamasi* sp. nov.
- Abdomen yellow with only brown spot on T5 and T6 . 31
- 31 Epandrium rounded with long setae; cercus long with long setae and one distinct seta on apex in lateral view; postgonite with one basal seta in ventral view; surstylus rounded with about 8–13 setae and two strong spines; hypandrium U-shaped; mesophallus tubular; distiphallus bulb-shaped with one apical spine on each side (Figs 87, 88); ejaculatory apodeme broad, at its broader part about 4.0 times wider than constricted area at base (Fig. 89)] [Brazil] *P. spinifera* sp. nov.
- Epandrium rounded with long setae; cercus long with long setae; surstylus rounded with about 11–19 setae; hypandrium U-shaped; distiphallus membranous, sclerotized centrally (Figs 45, 46); ejaculatory apodeme broad, at its broader part about 3.7 times wider than constricted area at base (Fig. 47)] [Brazil] *P. delicata* sp. nov.

ACKNOWLEDGEMENTS

We are very grateful to Carlos Einicker Lamas (Museu de Zoologia, Universidade de São Paulo) and Silvio Shigueo Nihei (Instituto de Biologia, Universidade de São Paulo) for the opportunity to participate in the SISBIOTA project. We thank Luiz Antonio Alves da Costa (Museu Nacional, Universidade Federal do Rio de Janeiro) for the final art of the drawings. Thanks also to Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP process 2010/52314-0) and Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq process 563256/2010-9) for the support to the SISBIOTA Diptera Project. We are grateful for the financial supports (VRS: MsC/CNPq process 114102988, MSC: CNPq process 300382/2010-3).

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 Submitted: 16 February 2017

Received in revised form: 15 May 2017

Accepted: 26 May 2017

Editorial responsibility: Gabriel L.F. Mejdalani

Author Contributions: VRS and MSC contributed equally to this work.

Competing Interests: The authors have declared that no competing interests exist.